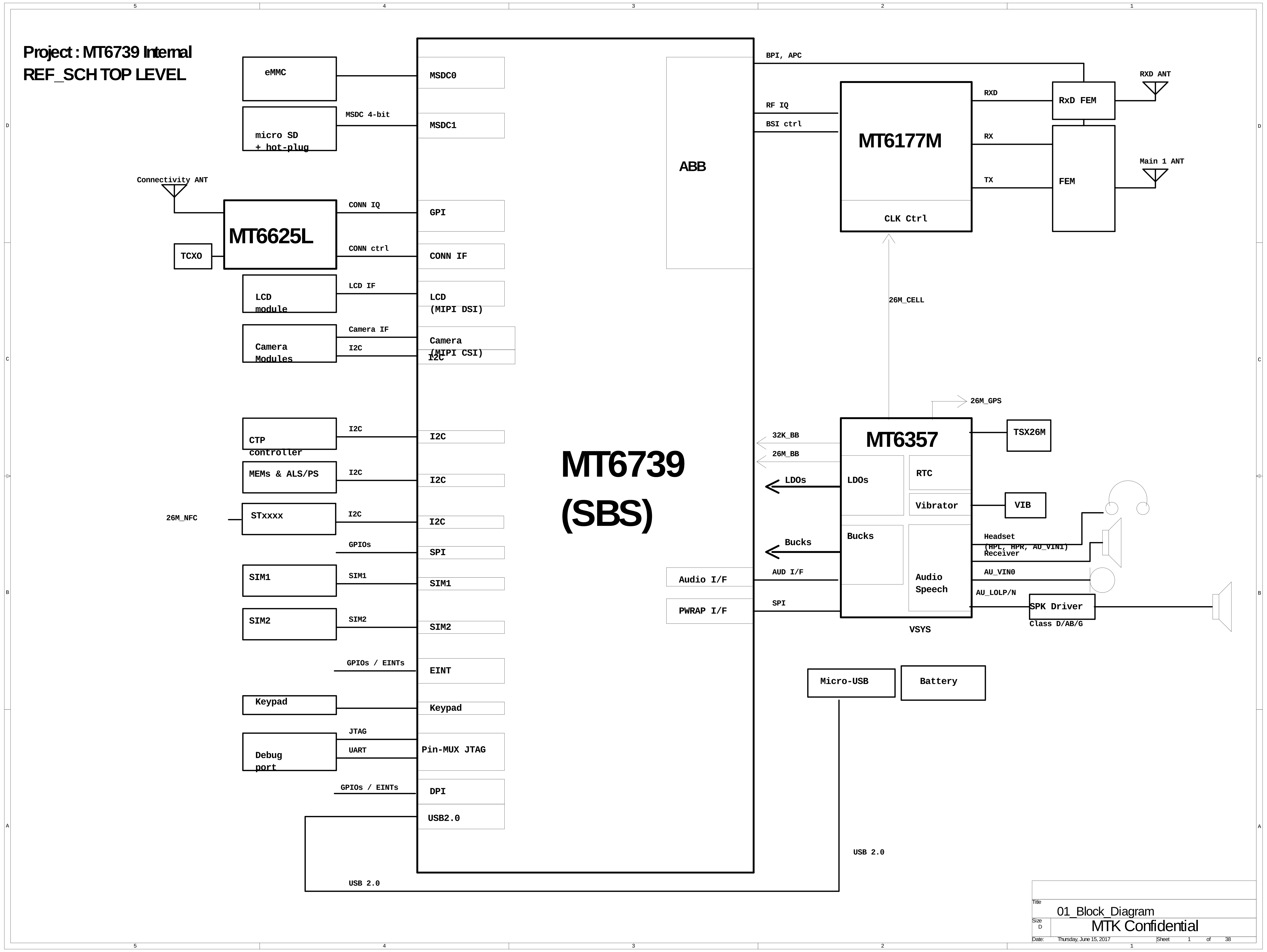
Project : MT6739 Internal
REF_SCH TOP LEVEL
eMMC
micro SD + hot-plug
MSDC 4-bit
MSDC0
MSDC1
Connectivity ANT
MT6625L
TCXO
CONN IQ
CONN ctrl
GPI
CONN IF
LCD module
LCD IF
LCD (MIPI DSI)
Camera Modules
Camera IF
I2C
Camera (MIPI CSI)
I2C
CTP controller
MEMs & ALS/PS
26M_NFC
STxxxx
GPIOs
SPI
SIM1
SIM2
GPIOs / EINTs
EINT
Keypad
Debug port
JTAG
UART
Pin-MUX JTAG
DPI
USB2.0
USB 2.0
MT6739 (SBS)
ABB
Audio I/F
PWRAP I/F
BPI, APC
RF IQ
BSI ctrl
MT6177M
CLK Ctrl
RXD
RX
TX
RxD FEM
FEM
RXD ANT
Main 1 ANT
26M_CELL
26M_GPS
32K_BB
26M_BB
LDOs
Bucks
AUD I/F
MT6357
RTC
Vibrator
Audio Speech
TSX26M
VIB
Headset (HPL, HPR, AU_VIN1)
Receiver
AU_VIN0
AU_LOLP/N
SPK Driver
Class D/AB/G
VSYS
Micro-USB
Battery
01_Block_Diagram
MTK Confidential
Thursday, June 15, 2017
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I2C	Function	I2C Spec.	Budget Timing	I2C Slave Address (7-bit mode)
I2C-0	LCM Gate Driver	400 Kbps	Yes.	RT4801A-50WSC I2C address: 0X3E (Write:0x7C, Read:0x7D)
	CTP	400 Kbps	Yes.	GT1151 I2C address: 0X5D (Write:0xBA, Read:0xBB) or 0x14 (Write:0x28, Read:0x29)
I2C-1	Switching Charger	400 Kbps	Yes.	RT9458WSC I2C address: 0X6A (Write:0xD4, Read:0xD5)
	Flash LED Driver	400 Kbps	Yes.	RT4505 I2C address: 0X63 (Write:0xC6, Read:0xC7)
	Gyro Sensor	400 Kbps		ITG1010 I2C address: 0X68
	M Sensor	400 Kbps		AK09918C I2C address: 0X0C
	M Sensor(reserved)	400 Kbps		AK09911C I2C address: 0X0D
	Baro Sensor	400 Kbps		BMP280 I2C address: 0X77
	Accelerometer	400 Kbps		MC3413 I2C address: 0X4C
	RGB / PS Sensor	400 Kbps		CM36558 I2C address: 0X51
	RGB / PS Sensor (reserved)	400 Kbps		CM36552 I2C address: 0X60
I2C-2	Rear Camera - 13M Sensor	400 Kbps	Yes.	OV13870 I2C address: 0X10 (Write:0x20, Read:0x21)
	Rear Camera - AF driver	400 Kbps	Yes.	LC-898217 I2C address: 0X72 (Write:0xE4, Read:0xE5)
	Front Camera - 8M Sensor	400 Kbps	Yes.	OV8856 I2C address: 0X36 (Write:0x6C, Read:0x6D)
I2C-3	NFC	400 Kbps	Yes.	ST21NFCD I2C address: 0X08 (Write:0x10, Read:0x11)
I2C-SW	3/4 SIM Switch			MT6306 I2C address: 0X64 (Write:0xC8, Read:0xC9)
I2C-5	Sub PMIC (Just Reference)	3.4 Mbps	Yes.	RT5101 I2C address: 0X34 (PMU) (Write:0x68, Read:0x69) ; 0X4E (PD) (Write:0x9C, Read:0x9D)

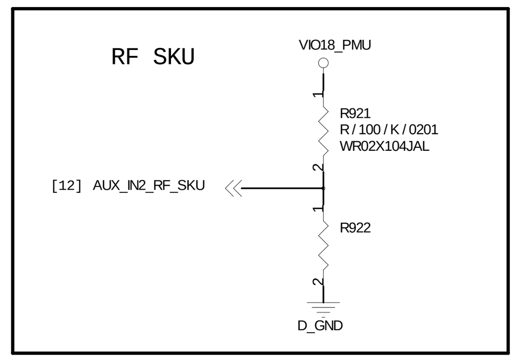
Note : I2C Spec. : Standard mode (100 kbps) and Fast mode (400 kbps), Fast mode Plus (1 Mbps) and High-speed mode (3.4 Mbps)

Title: 02_I2C_ID_Overview
Size: D
MTK Confidential
Date: Thursday, June 15, 2017 Sheet 2 of 38

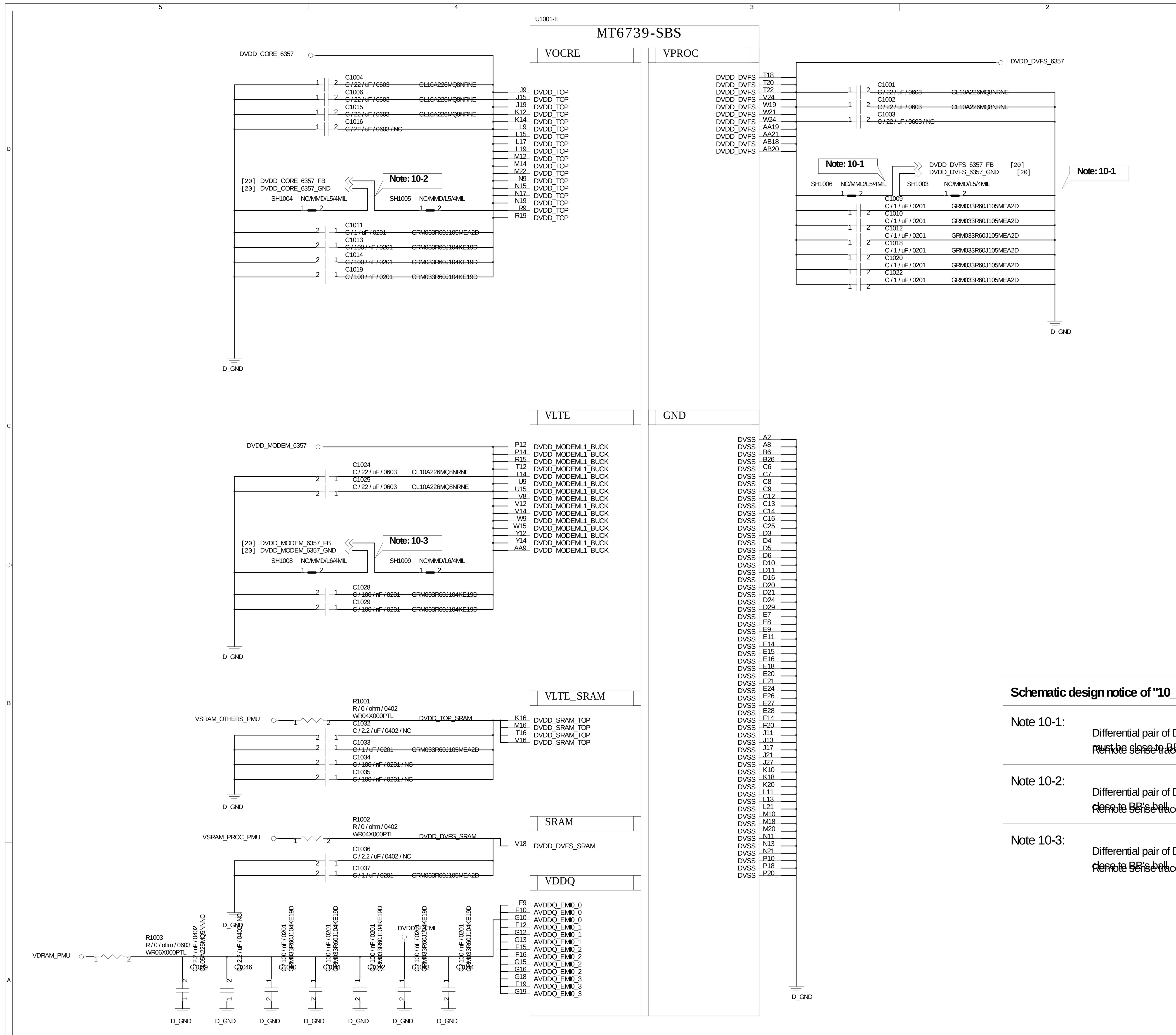
Date	Category	Item
2017.04.20	SIM	C1119, C1120, C2131, C2132 change to C / 2.2 / uF / 0402
2017.04.20	Memory	C4012, C4013 change to NC ; C4014, C4015 change to C / 100 / nF / 0201
2017.04.20	PMIC	C2604 change net connection and change to C / 100 / nF / 0402
2017.04.24	RF	R2214 change to L / 22 / nH / 0201 ; C2209 change to C / 5 / pF / 0201 U3205 Olny BOM change to SAW / F6HQ2G593AP31
2017.04.24	AUXIN	C1201, C1202, C1203 change to C / 1 / uF / 0201
2017.04.26	WCN	R2216 change to L / 22 / nH / 0201 ; C2210 change to C / 5 / pF / 0201
2017.04.27	Camera	C6303, C6310 change to C / 2.2 / uF / 0402
2017.05.08	NFC	R5209, R5210, R5211, R5212 change to R / 0 / ohm / 0201

AUX_IN2_RF_SKU
(ADC range is 0.05~1.45V)

Voltage	R921	R922	SKU
0.000V	NC	100K	Reserve-6
0.300V	100K	20K	Reserve-5
0.576V	100K	47K	Reserve-4
0.900V	100K	100K	RF SKU-3
1.190V	51K	100K	RF SKU-2
1.450V	100K	NC	RF SKU-1



Title	09_BB_HW_Trap
Size D	MTK Confidential
Date: Thursday, June 15, 2017	Sheet 4 of 38



Schematic design notice of "10_BB_POWER_PDN" page.

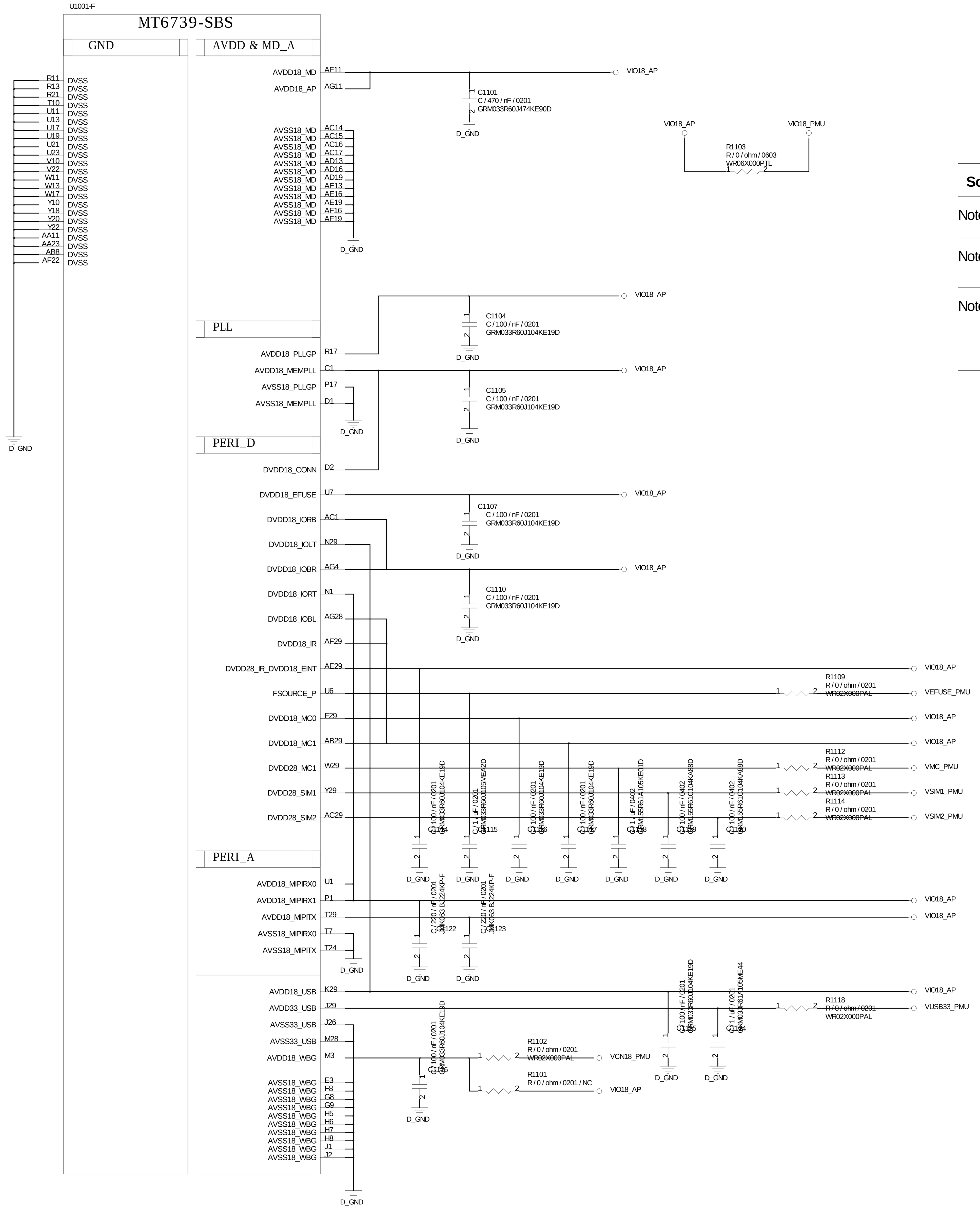
Note 10-1:	Differential pair of DVDD_DVFS remote sense must be close to BB's ball Remote sense trace with GND shielding to PMIC (Differential)
Note 10-2:	Differential pair of DVDD_TOP remote sense must be close to BB's ball Remote sense trace with GND shielding to PMIC (Differential)
Note 10-3:	Differential pair of DVDD_MODEM remote sense must be close to BB's ball Remote sense trace with GND shielding to PMIC (Differential)

Title: 10_BB_POWER_PDN

Size: D

MTK Confidential

Date: Thursday, June 15, 2017 Sheet 5 of 38



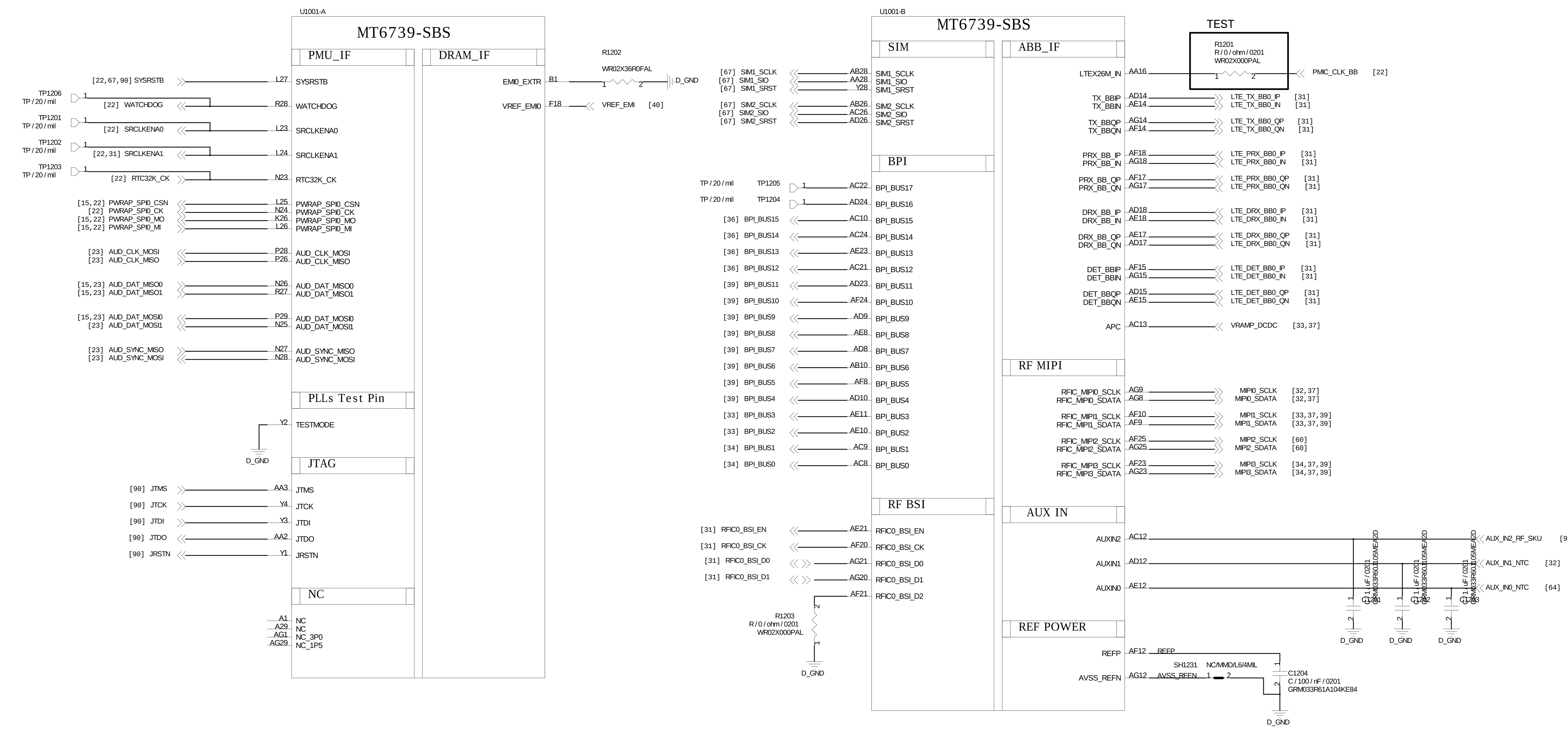
Schematic design notice of "11_BB_POWER_IO" page.

Note 11-1: AVDD28_DAC (AN4 ball) must be powered by "VFE28_PMU".

Note 11-2:
C10091 closed DVDD28_MSDC1 150mil
C10092 closed DVDD18_MSDC0 150mil

Note 11-3:
Connect AVDD33_USB_P1 (C31 ball) to "VSIM1_PMU" for IC-USB / Samrt card application.
Connect AVDD33_USB_P1 (C31 ball) to "VUSB33_PMU" for USB application or not used.

Title	11_BB_POWER_PDN
Size D	MTK Confidential
Date: Thursday, June 15, 2017	Sheet 6 of 38

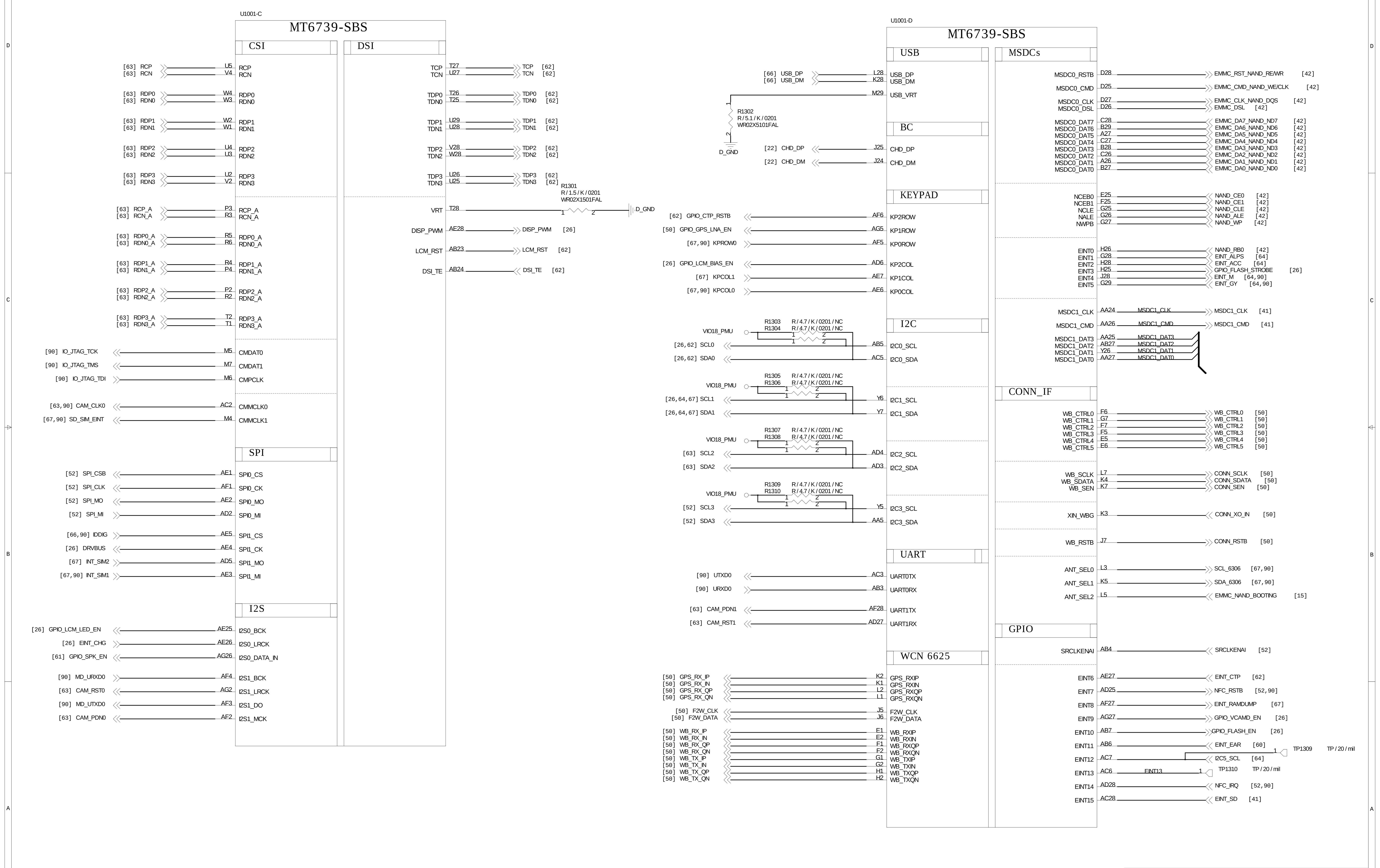


Schematic design notice of "11_BB_1" page.

Note 12-2: To shunt a 1uF capacitor in the AUXIN ADC input to prevent noise coupling. It should be placed as close to BB as possible. Connect the unused AUX ADC input to GND.

Note 12-3: The de-coupling cap. for REFP (AN19 ball) have to be placed as close to BB as possible.

Title	12_BB_1
Size D	MTK Confidential
Date: Thursday, June 15, 2017	Sheet 7 of 38



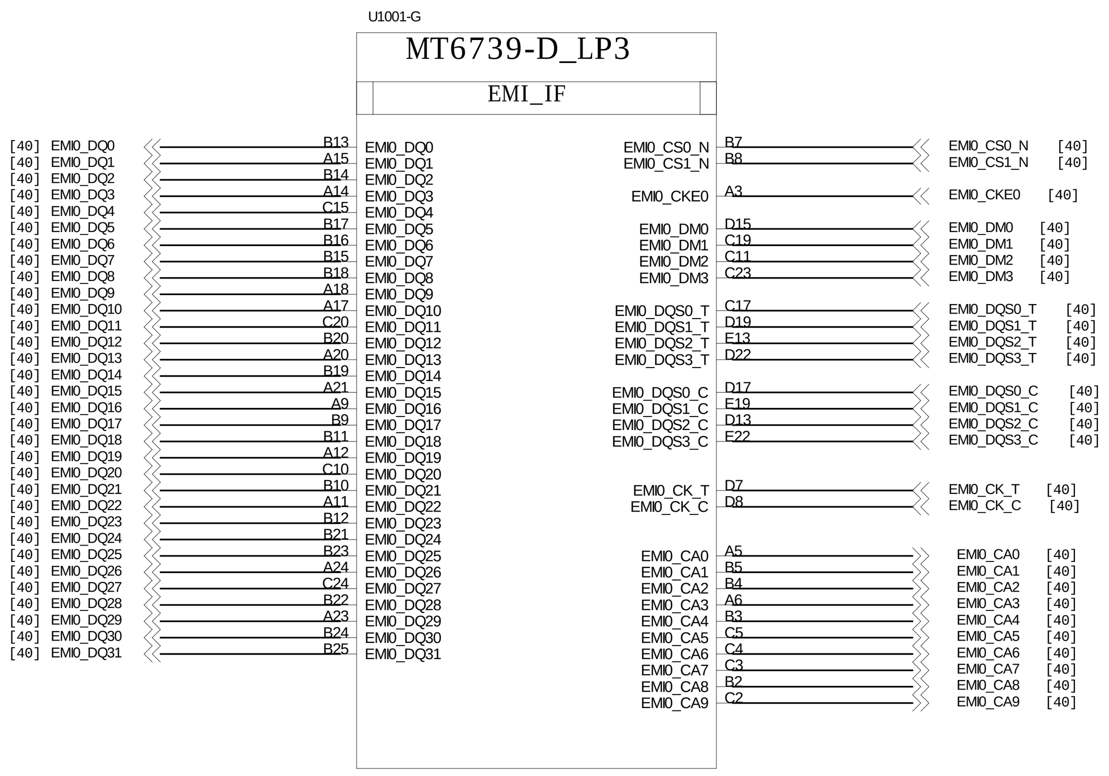
Title

13_BB_2

Size D

MTK Confidential

Date: Thursday, June 15, 2017 Sheet 8 of 38

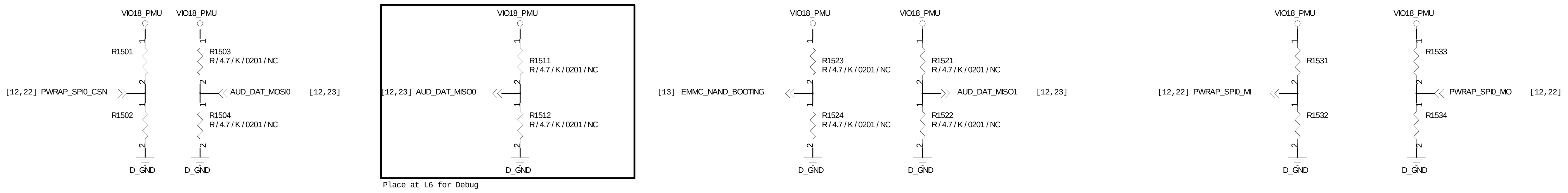


Title: 14_BB_3

Size: D

MTK Confidential

Date: Thursday, June 15, 2017 | Sheet 9 of 38



Schematic design notice of "15_BB_HW_Trap" page.

Note 15-1: PWRAP_SPI0_CSN and AUD_DAT_MOSI are JTAG feature in bootstrap.

PWRAP_SPI0_CSN	AUD_DAT_MOSI0	Mode	Note
HI	LO	Default	N/A
HI	HI	Aux Func. trap_MD_JTAG_AP_JTAG	MD JTAG = CMDAT0/CMDAT1/CMPCLK/CMMCLK/CMMCLK1
LO	LO	x	N/A
LO	HI	x	N/A

Note 15-2: AUD_DAT_MISO0 is USB JTAG feature in bootstrap.

AUD_DAT_MISO0	USB JTAG
LO	USB 2.0
HI	DP/DM output JTAG

Note 15-3: ANT_SEL2 and AUD_DAT_MISO1 is storage booting feature in bootstrap.

ANT_SEL2	AUD_DAT_MISO1	Storage Booting
HI	LO	TLC Boot
HI	HI	SLC Boot
LO	LO	eMMC Boot
LO	HI	N/A

Note 15-4: PWRAP_SPI0_MI and PWRAP_SPI0_MO are DDR type feature in bootstrap

PWRAP_SPI0_MI	PWRAP_SPI0_MO	DDR
LO	LO	LPDDR3
LO	HI	LPDDR4
HI	LO	LPDDR4X
HI	HI	LPDDR4X+

Title: 15_BB_HW_Trap

Size: D

MTK Confidential

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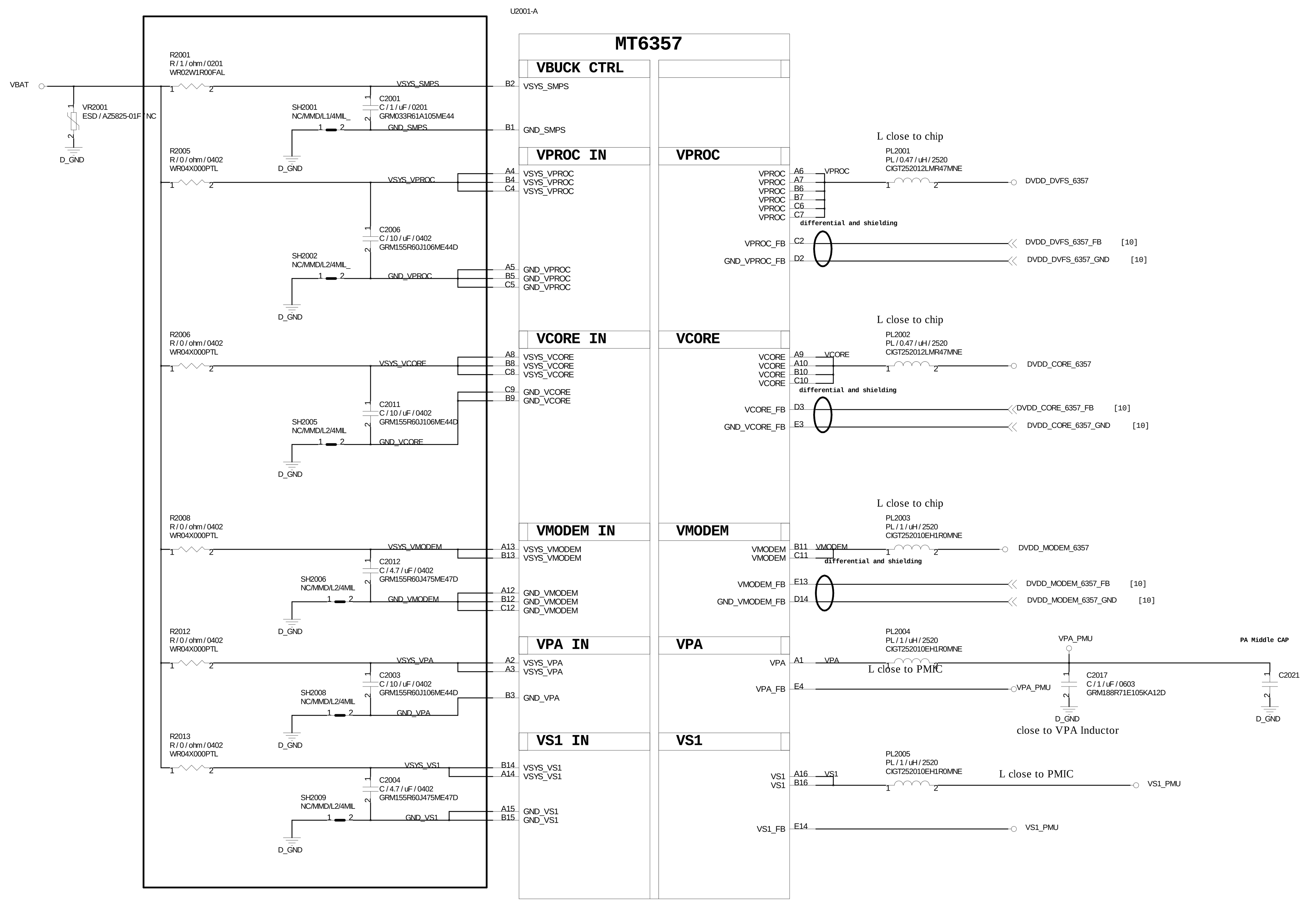
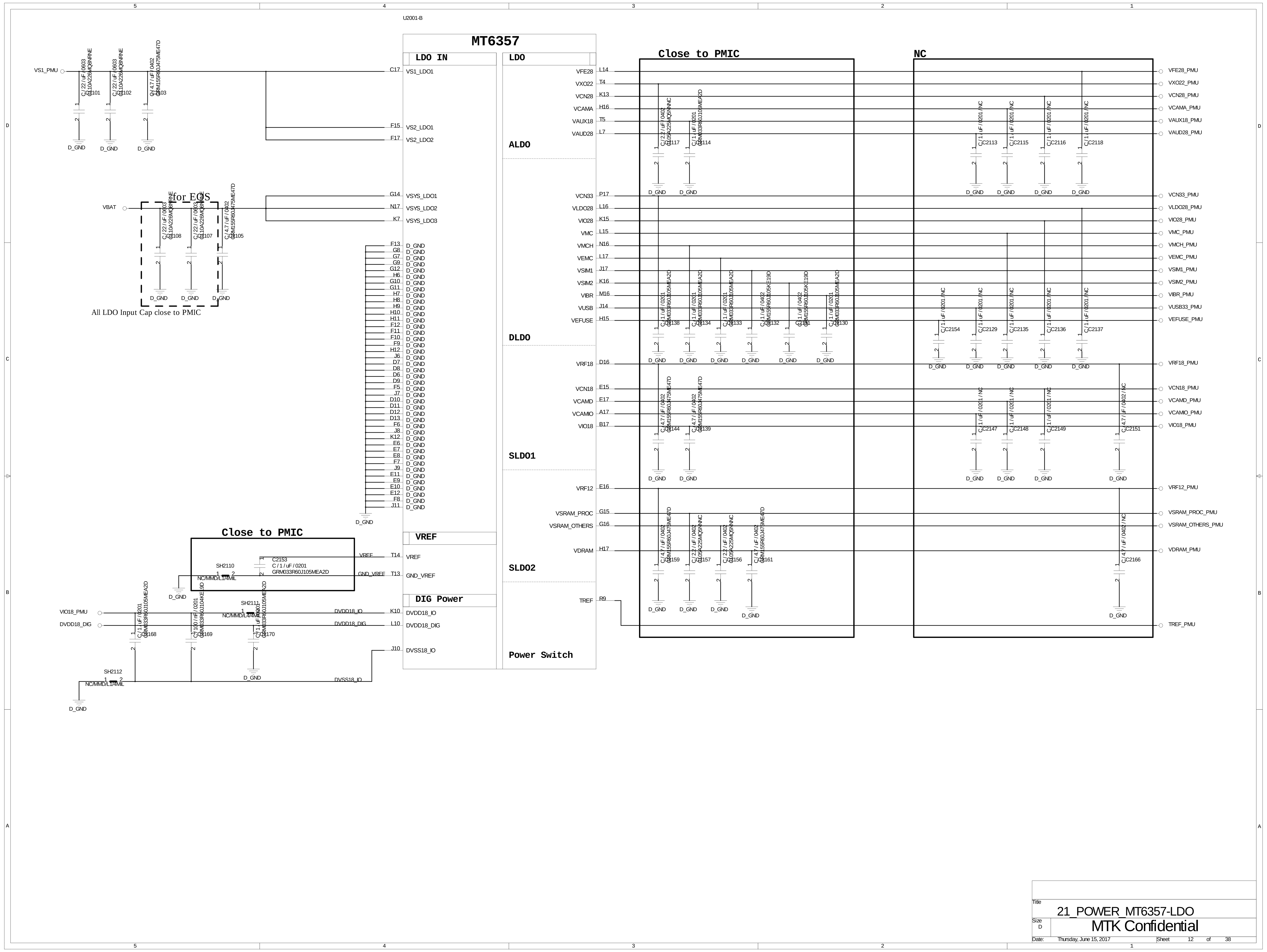


Title
20_POWER_MT6357-Buck

Size D
MTK Confidential

Date: Thursday, June 15, 2017 | Sheet 11 of 38


U2001-B
MT6357
LDO IN
LDO
ALDO
DLDO
SLDO1
SLDO2
VREF
DIG Power
Power Switch
Close to PMIC
NC
for EOS
All LDO Input Cap close to PMIC
VS1_PMU
VBAT
VIO18_PMU
DVDD18_DIG
VS1_LDO1
VS2_LDO1
VS2_LDO2
VSYS_LDO1
VSYS_LDO2
VSYS_LDO3
D_GND
VREF
GND_VREF
DVDD18_IO
DVDD18_DIG
DVSS18_IO
VFE28
VXO22
VCN28
VCAMA
VAUX18
VAUD28
VCN33
VLDO28
VIO28
VMC
VMCH
VEMC
VSIM1
VSIM2
VIBR
VUSB
VEFUSE
VRF18
VCN18
VCAMD
VCAMIO
VIO18
VRF12
VSRAM_PROC
VSRAM_OTHERS
VDRAM
TREF
VFE28_PMU
VXO22_PMU
VCN28_PMU
VCAMA_PMU
VAUX18_PMU
VAUD28_PMU
VCN33_PMU
VLDO28_PMU
VIO28_PMU
VMC_PMU
VMCH_PMU
VEMC_PMU
VSIM1_PMU
VSIM2_PMU
VIBR_PMU
VUSB33_PMU
VEFUSE_PMU
VRF18_PMU
VCN18_PMU
VCAMD_PMU
VCAMIO_PMU
VIO18_PMU
VRF12_PMU
VSRAM_PROC_PMU
VSRAM_OTHERS_PMU
VDRAM_PMU
TREF_PMU
C2153
C / 1 / uF / 0201
GRM033R60J105MEA2D
SH2110
SH2112
Title
21_POWER_MT6357-LDO
Size
D
MTK Confidential
Date: Thursday, June 15, 2017
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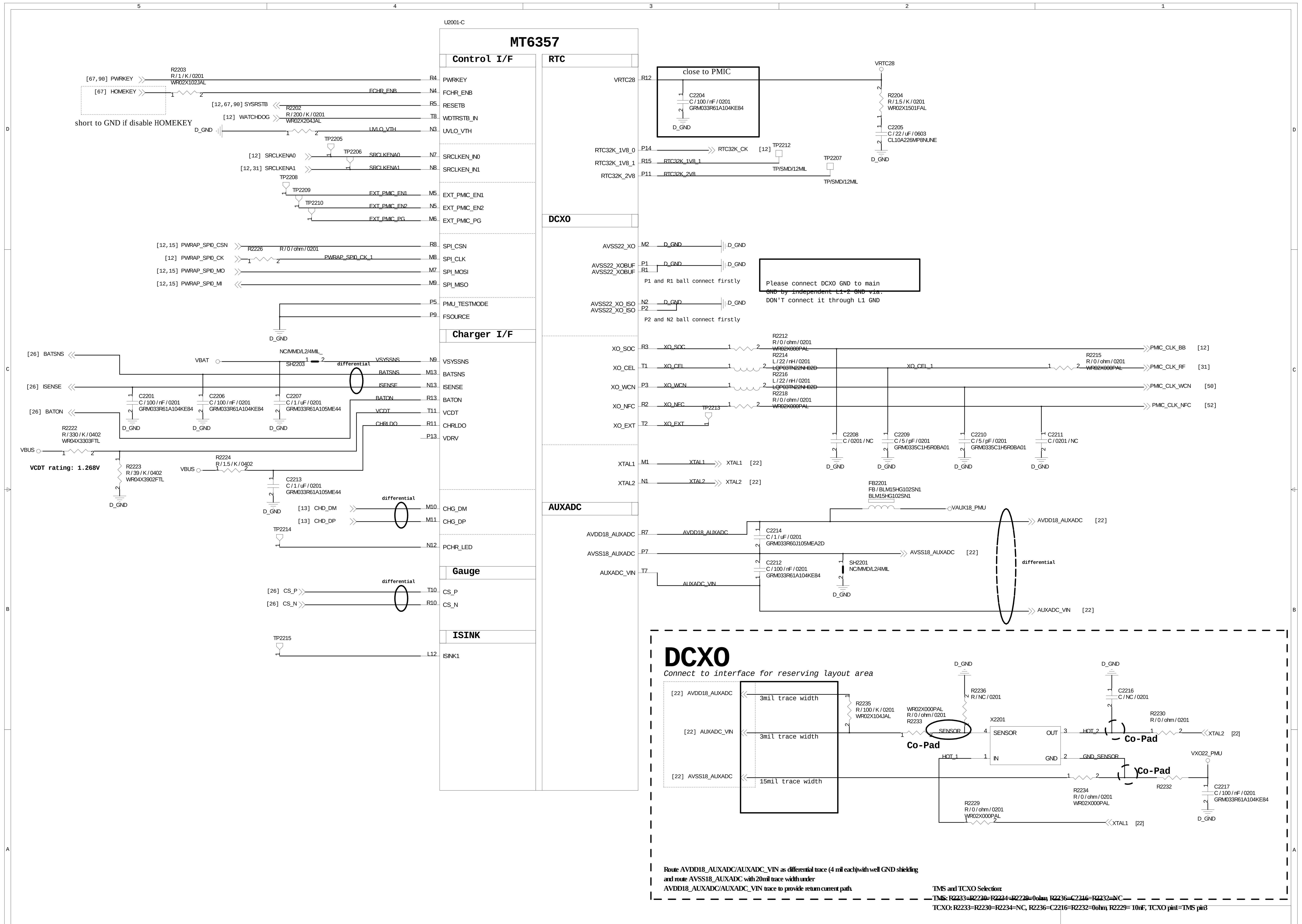
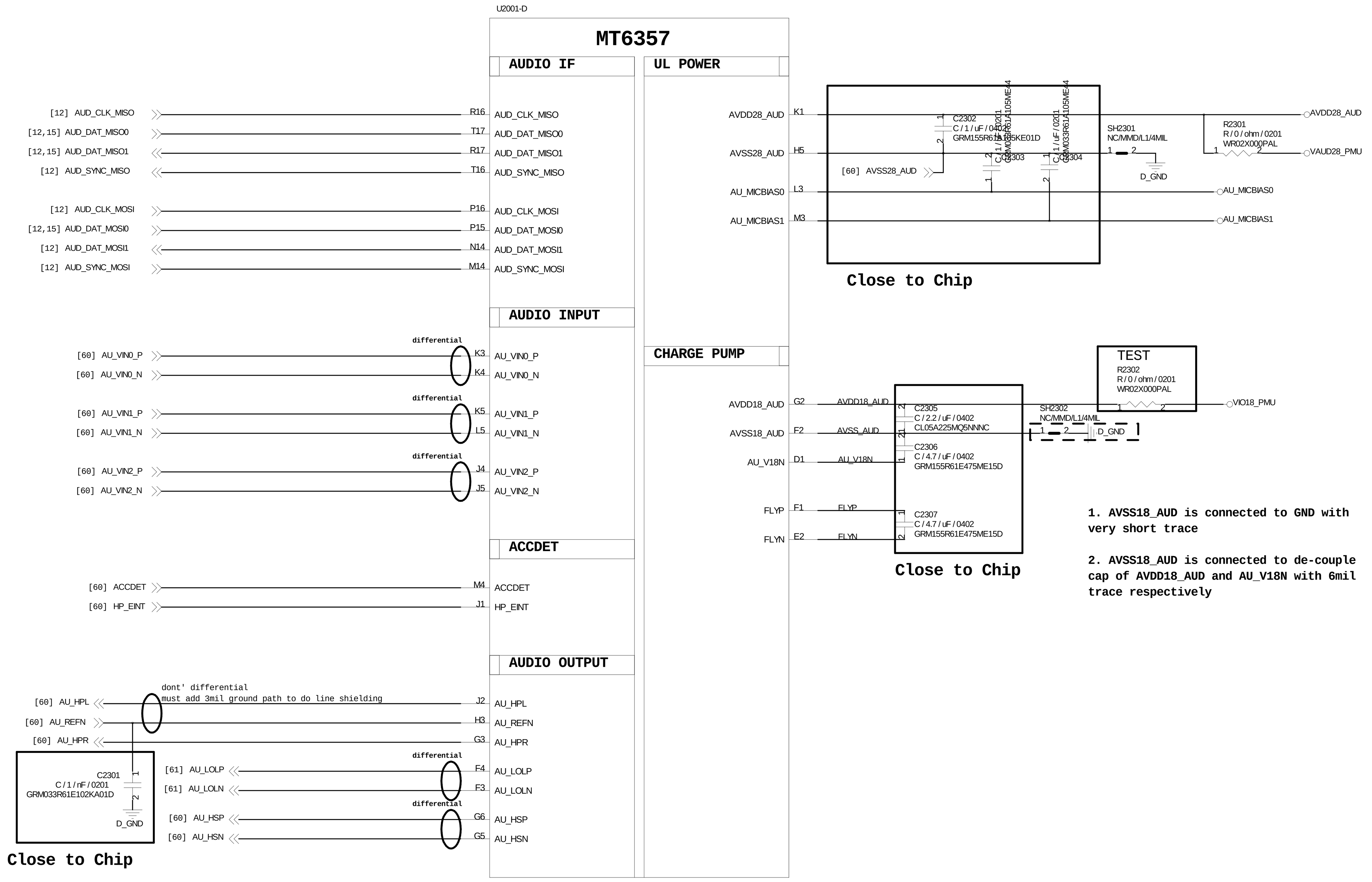


Title	22_POWER_MT6356-IF
Size D	MTK Confidential
Date: Thursday, June 15, 2017	Sheet 13 of 38

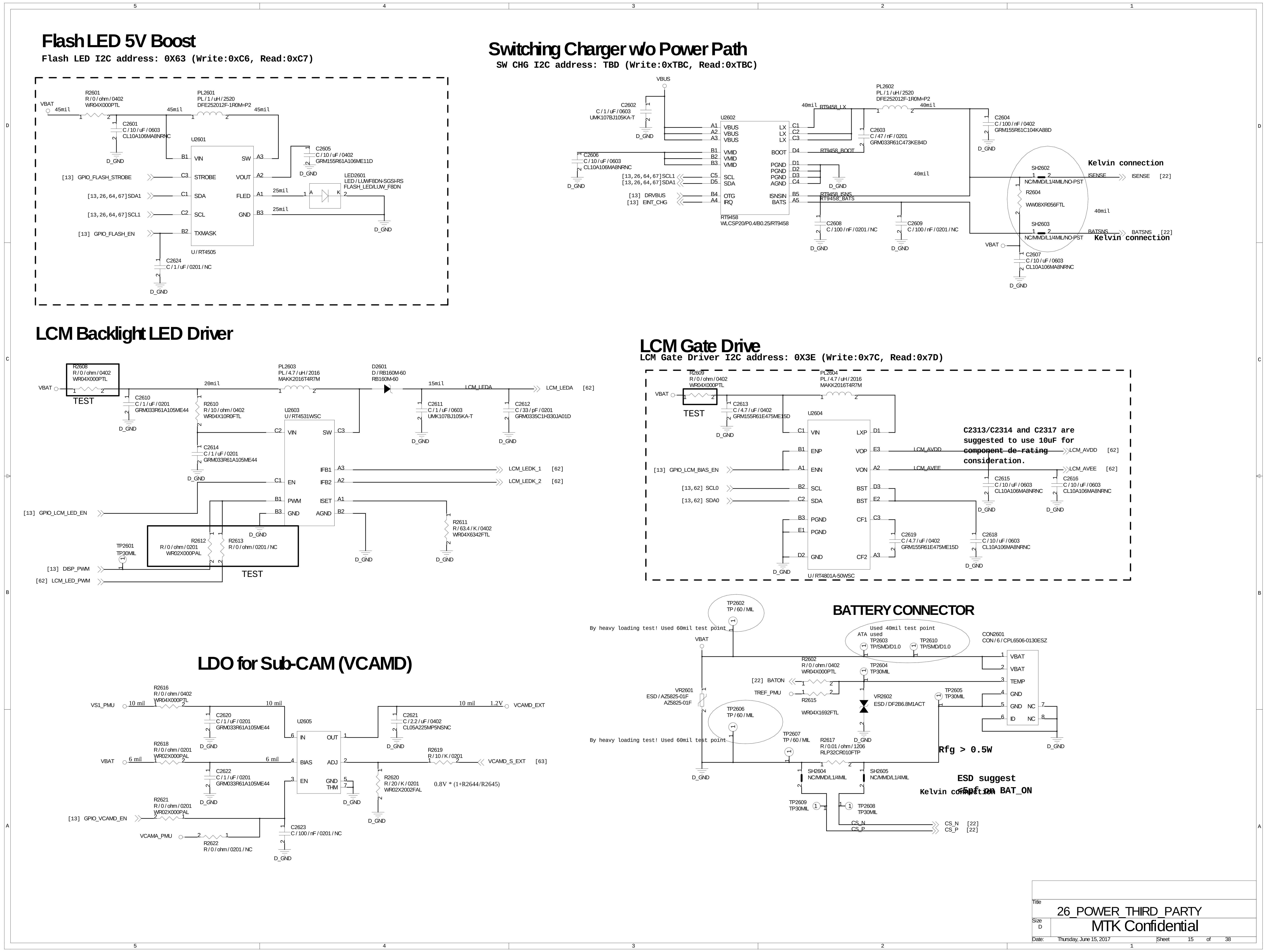


Title: 23_POWER_MT6357-Audio

Size: D

MTK Confidential

Date: Thursday, June 15, 2017 | Sheet 14 of 38


Flash LED 5V Boost
Flash LED I2C address: 0X63 (Write:0xC6, Read:0xC7)
Switching Charger w/o Power Path
SW CHG I2C address: TBD (Write:0xTBC, Read:0xTBC)
Kelvin connection
Kelvin connection
LCM Backlight LED Driver
TEST
TEST
LCM Gate Drive
LCM Gate Driver I2C address: 0X3E (Write:0x7C, Read:0x7D)
TEST
C2313/C2314 and C2317 are suggested to use 10uF for component de-rating consideration.
BATTERY CONNECTOR
By heavy loading test! Used 60mil test point
Used 40mil test point
By heavy loading test! Used 60mil test point
Rfg > 0.5W
ESD suggest
Kelvin connection
LDO for Sub-CAM (VCAMD)
0.8V * (1+R2644/R2645)
26_POWER_THIRD_PARTY
MTK Confidential
Thursday, June 15, 2017
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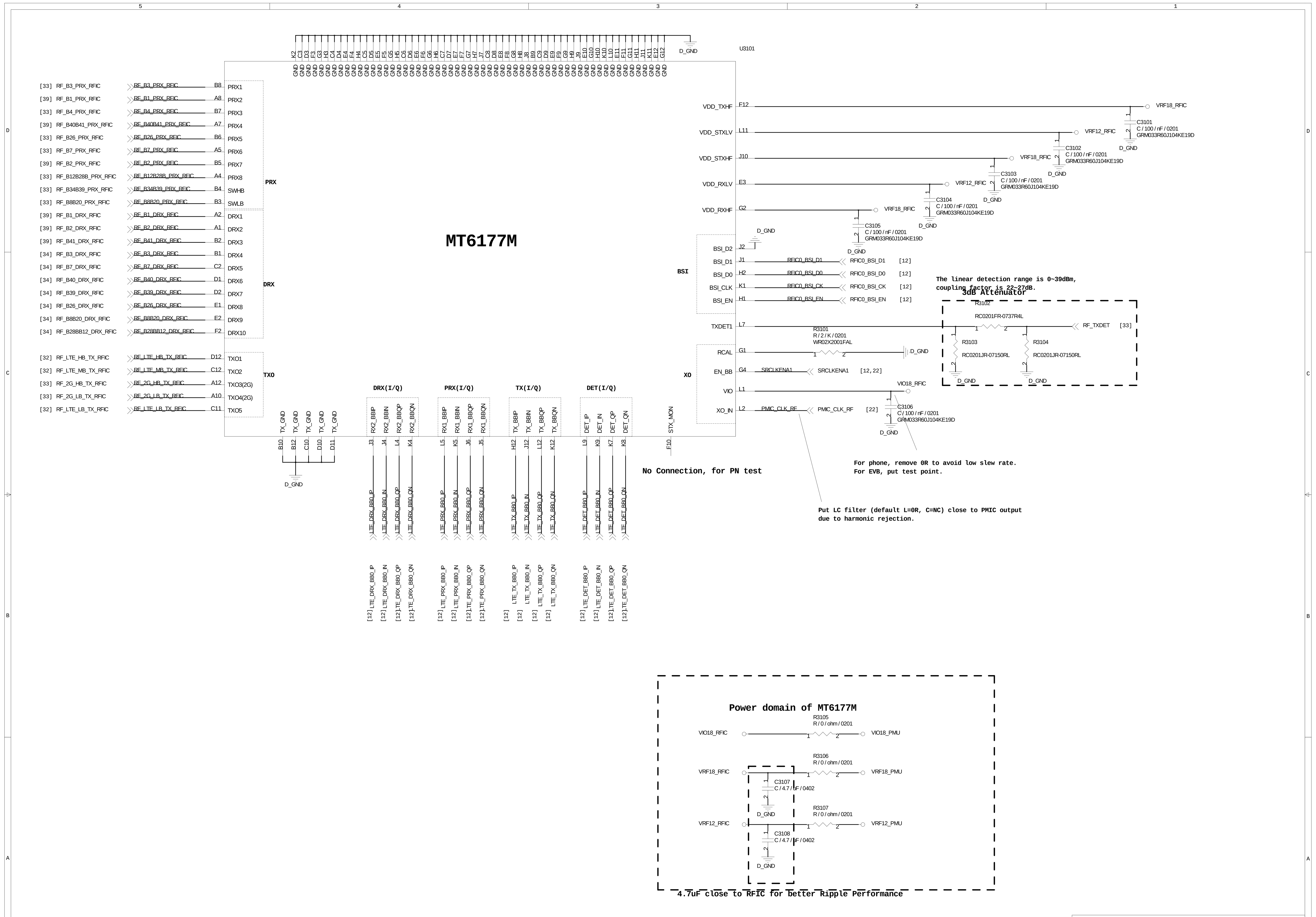

Title: 31_RF_MT6177M_Pin_Out

Size: D — MTK Confidential

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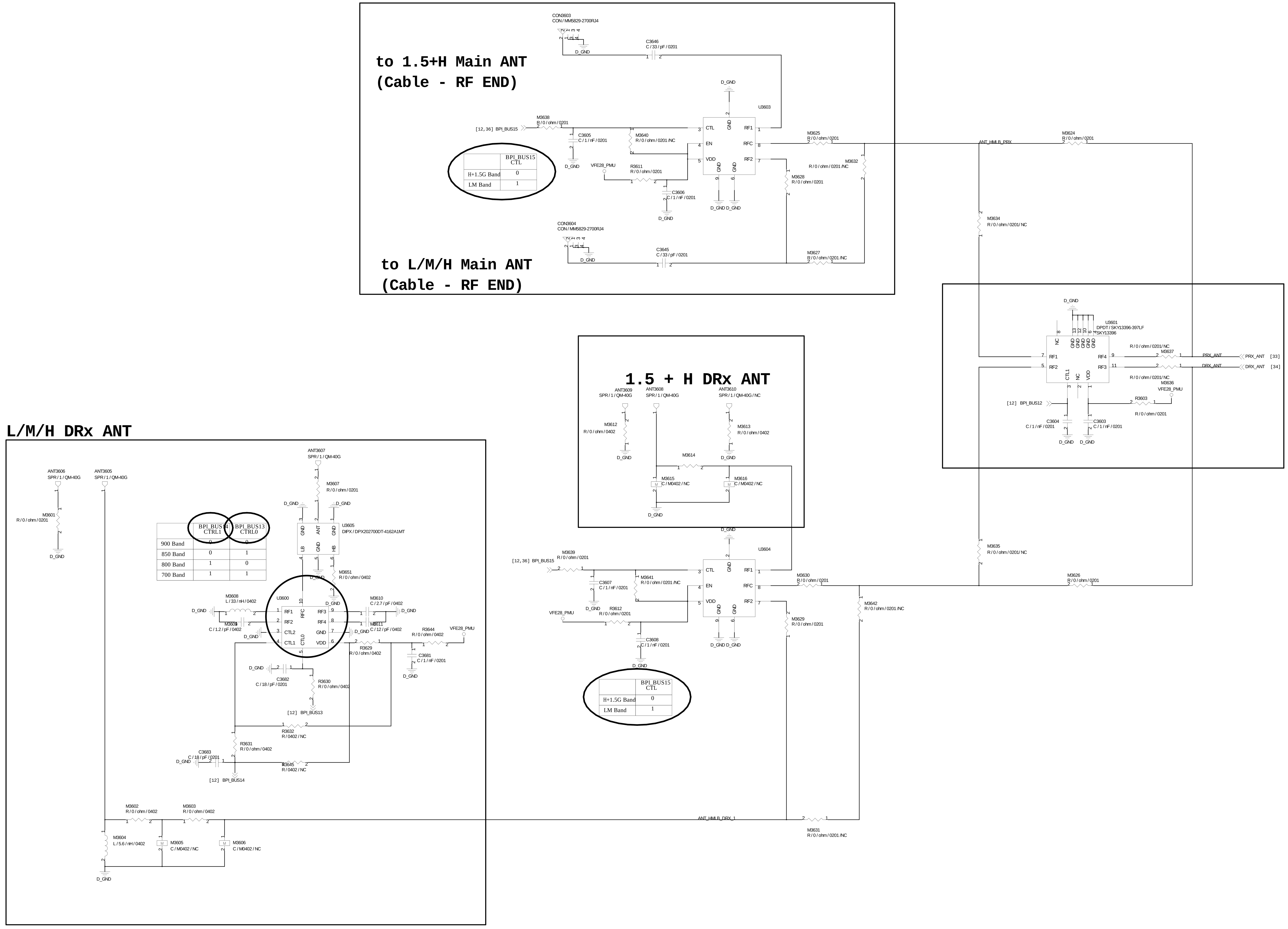
Title
32_RF_MT6177M_RF_TX
Size D
MTK Confidential
Date: Thursday, June 15, 2017 Sheet 17 of 38

Title
33_RF_MT6177M_RF_PRX
Size D
MTK Confidential
Date: Thursday, June 15, 2017 Sheet 18 of 38

Title: 34_RF_MT6177M_RF_DRX
Size: D
MTK Confidential
Date: Thursday, June 15, 2017 Sheet 19 of 38



	BPI_BUS15 CTL
H+1.5G Band	0
LM Band	1

	BPI_BUS14 CTRL1	BPI_BUS13 CTRL0
900 Band	0	0
850 Band	0	1
800 Band	1	0
700 Band	1	1

	BPI_BUS15 CTL
H+1.5G Band	0
LM Band	1

TAS
H/M/LB ANT:DPDT

	CTRL1
RF3 to RF1 ; RF4 to RF2	1
RF3 to RF2 ; RF4 to RF1	0

Default=0

Title	36_RF_ANT
Size D	MTK Confidential
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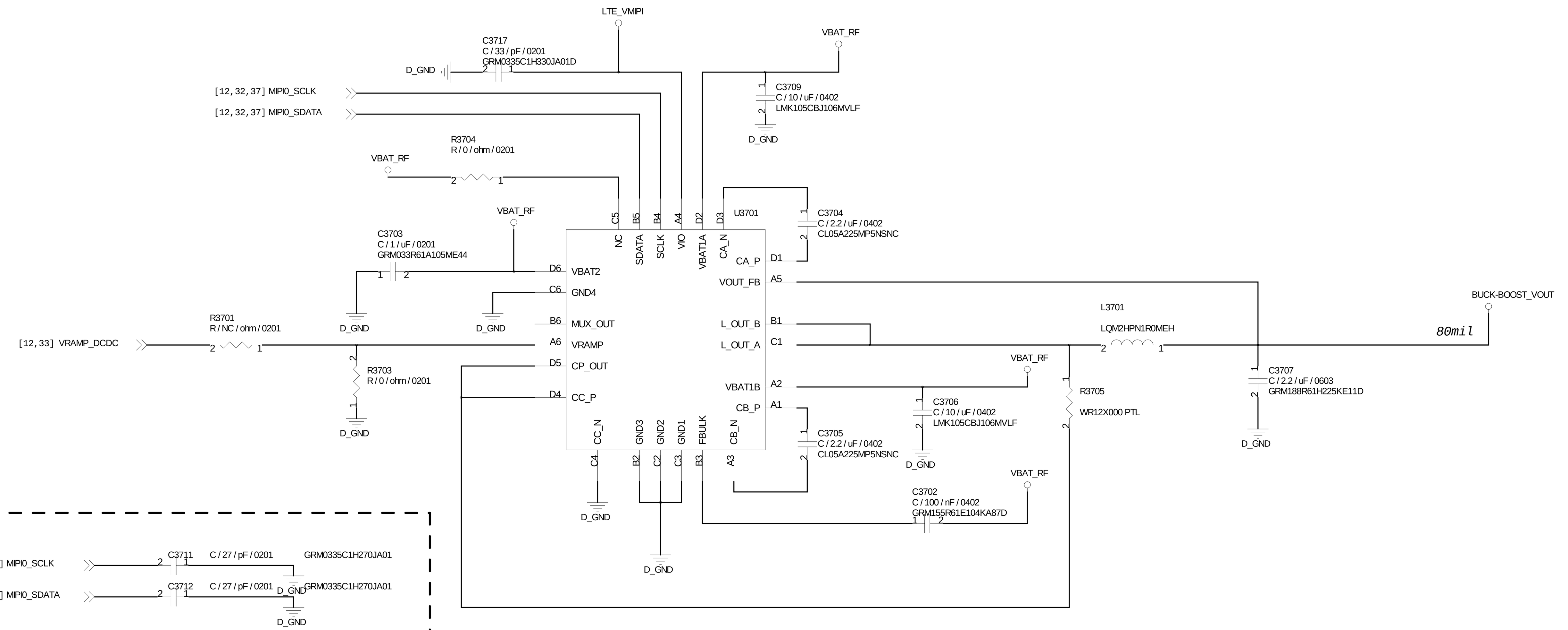
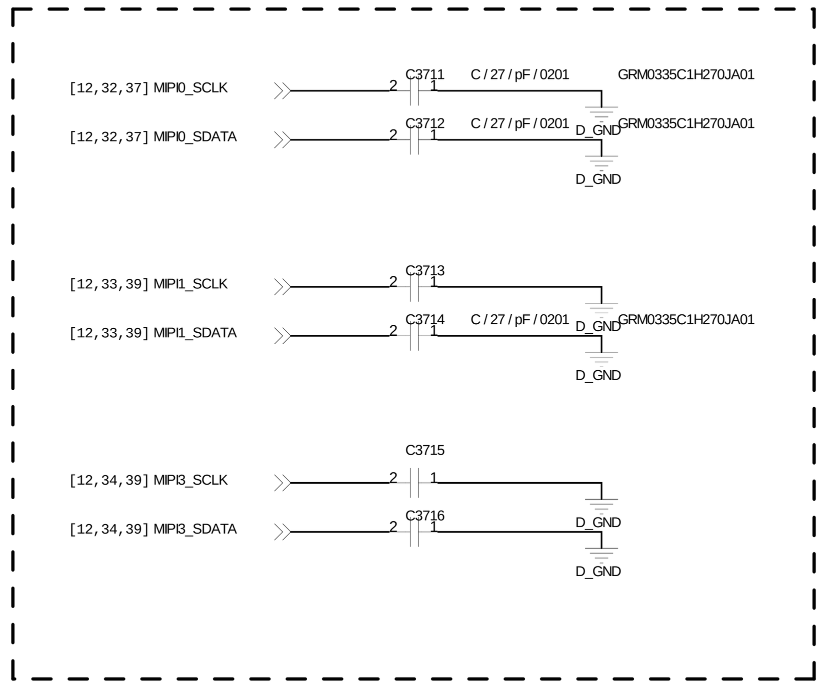
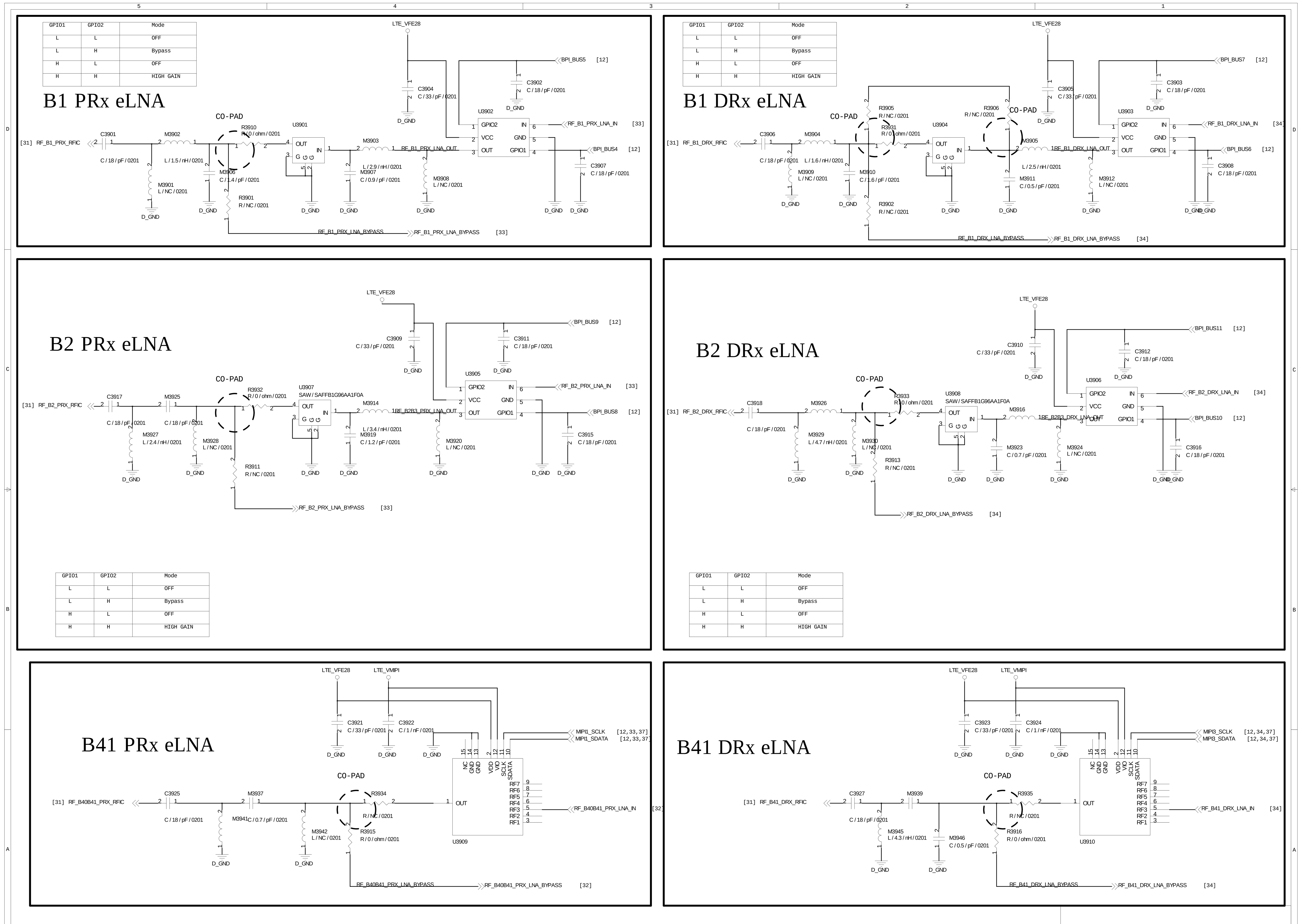




Reserved for MIPI Line C-Load, Placed in RF shielding Cover

Title	37_Skyblue
Size D	MTK Confidential
Date: Thursday, June 15, 2017	Sheet 21 of 38



GPIO1	GPIO2	Mode
L	L	OFF
L	H	Bypass
H	L	OFF
H	H	HIGH GAIN

GPIO1	GPIO2	Mode
L	L	OFF
L	H	Bypass
H	L	OFF
H	H	HIGH GAIN

GPIO1	GPIO2	Mode
L	L	OFF
L	H	Bypass
H	L	OFF
H	H	HIGH GAIN

GPIO1	GPIO2	Mode
L	L	OFF
L	H	Bypass
H	L	OFF
H	H	HIGH GAIN

Title: 39_eLNA

Size: D — MTK Confidential

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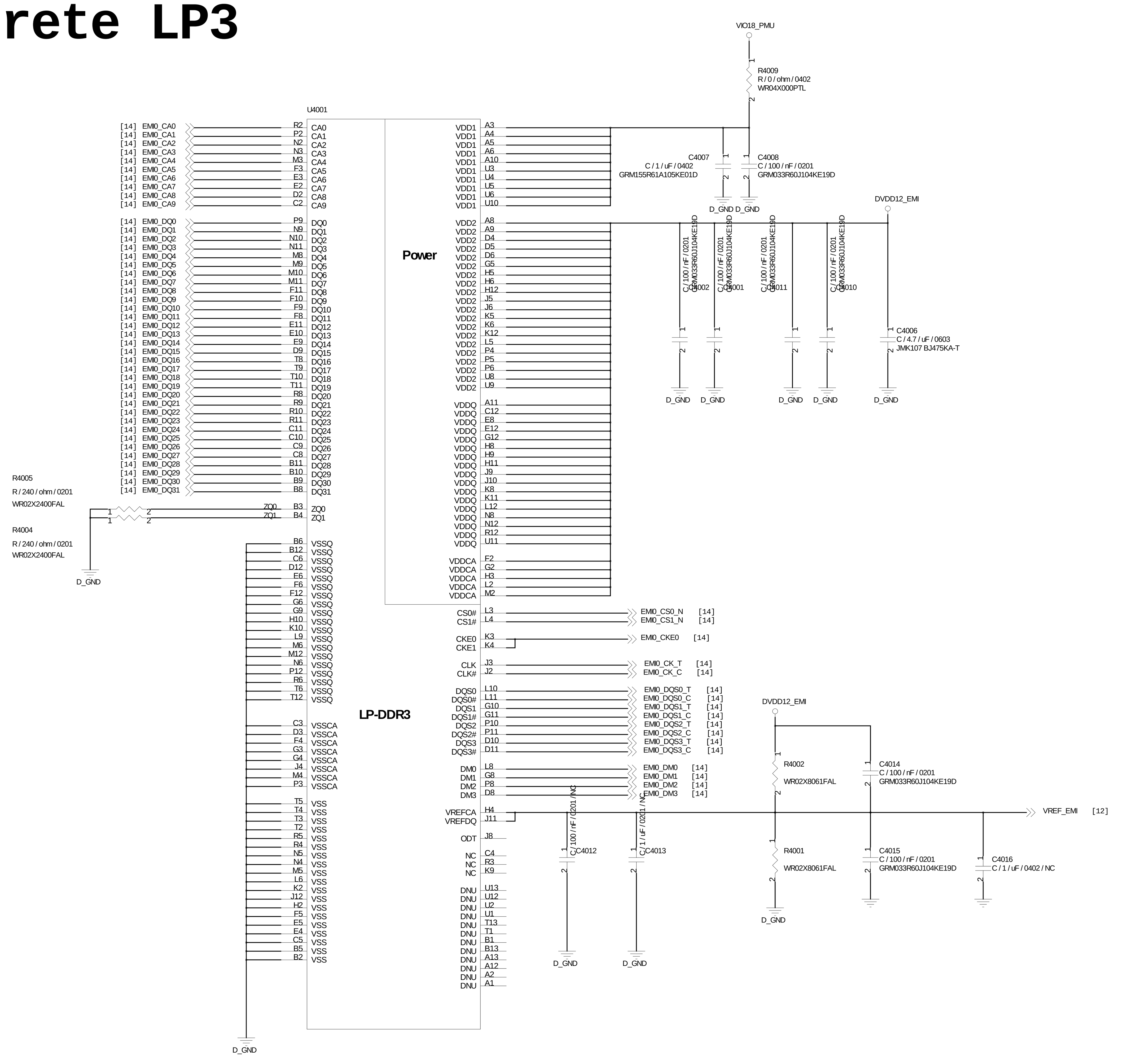
discrete LP3



Title
40_Memory_discrete_LP3
Size D
MTK Confidential
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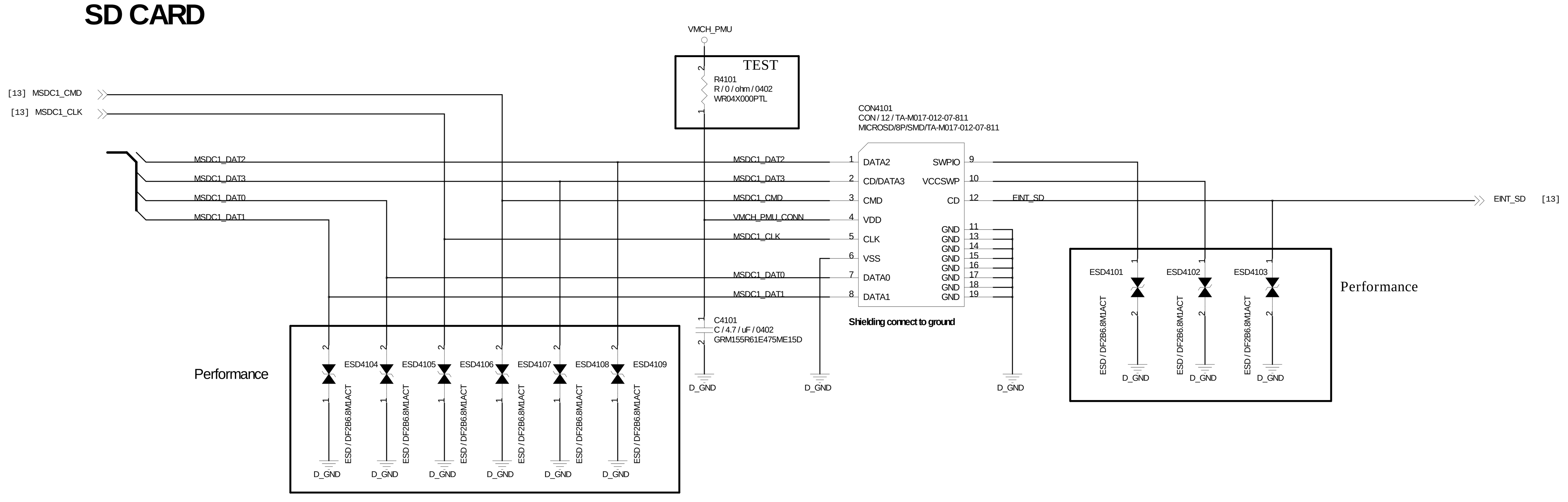
SD CARD

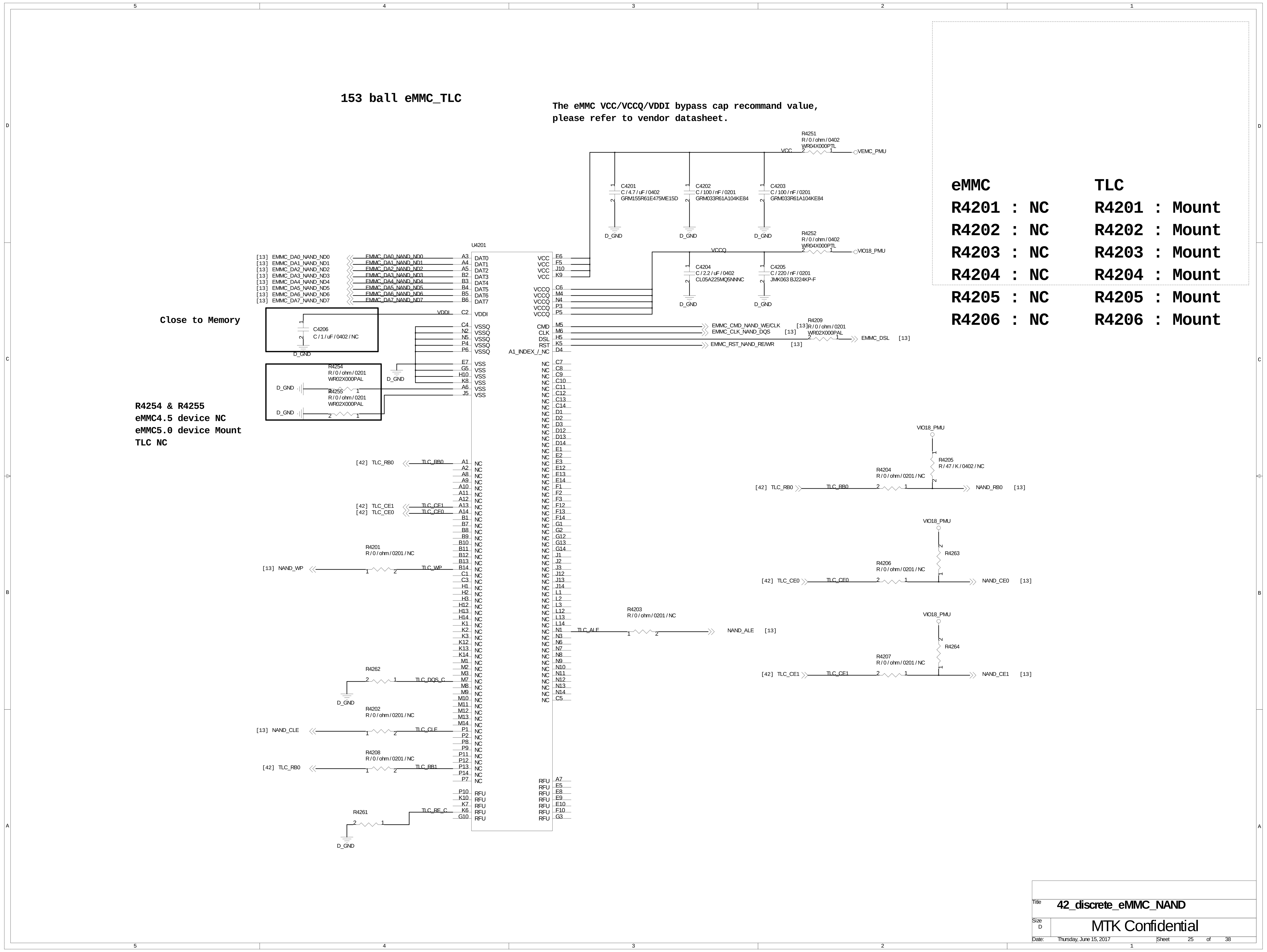


Schematic design notice of "40_MEMORY_SD Card" page.

Note 40-1:

The equivalent capacitance of ESD protection device must be <=0.5pF
-- otherwise it will result in NFC card mode function fail.

Title	41_MEMORY_SD Card
Size D	MTK Confidential
Date: Thursday, June 15, 2017	Sheet 24 of 38


153 ball eMMC_TLC
The eMMC VCC/VCCQ/VDDI bypass cap recommand value,
please refer to vendor datasheet.
Close to Memory
R4254 & R4255
eMMC4.5 device NC
eMMC5.0 device Mount
TLC NC
eMMC
R4201 : NC
R4202 : NC
R4203 : NC
R4204 : NC
R4205 : NC
R4206 : NC
TLC
R4201 : Mount
R4202 : Mount
R4203 : Mount
R4204 : Mount
R4205 : Mount
R4206 : Mount
U4201
VEMC_PMU
VIO18_PMU
EMMC_CMD_NAND_WE/CLK
EMMC_CLK_NAND_DQS
EMMC_RST_NAND_RE/WR
EMMC_DSL
NAND_RB0
NAND_CE0
NAND_CE1
NAND_ALE
NAND_WP
NAND_CLE
D_GND
Title
42_discrete_eMMC_NAND
Size D
MTK Confidential
Date: Thursday, June 15, 2017
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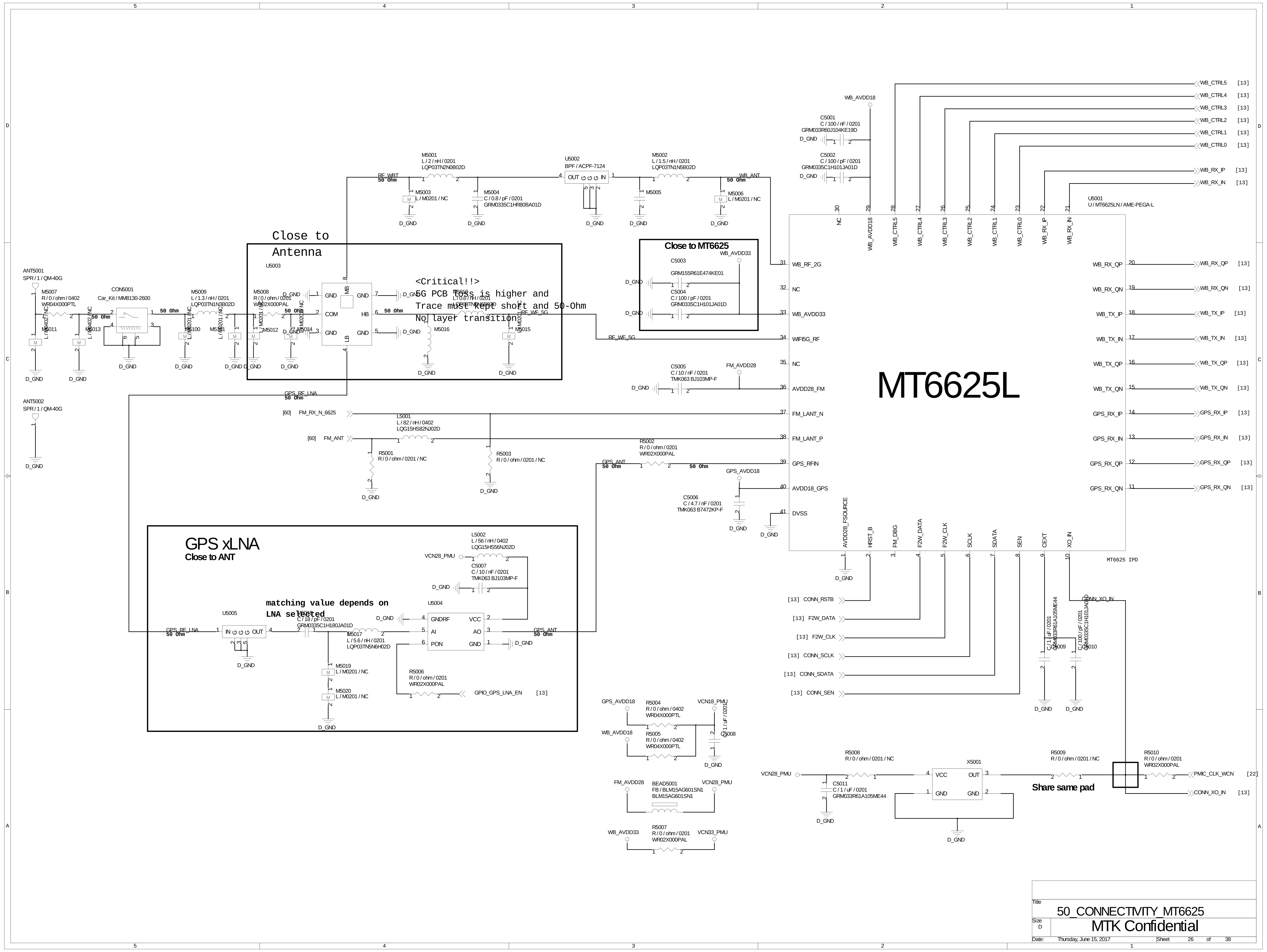

Title
50_CONNECTIVITY_MT6625
Size D
MTK Confidential
Date: Thursday, June 15, 2017
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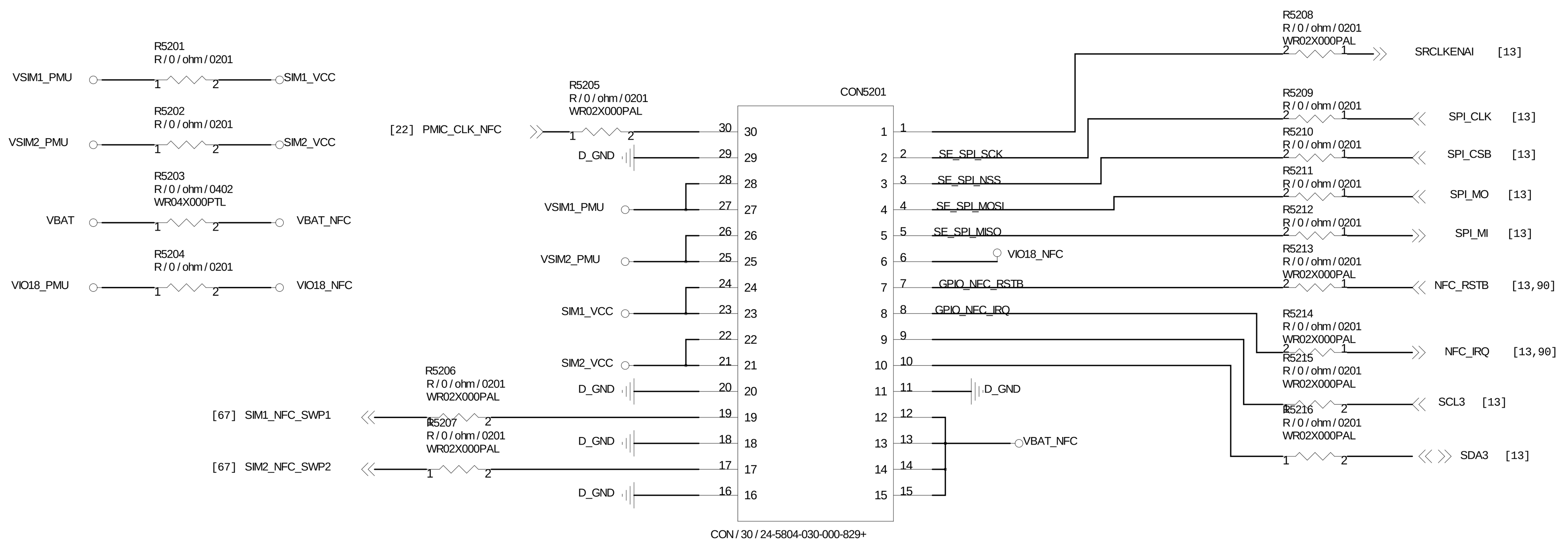
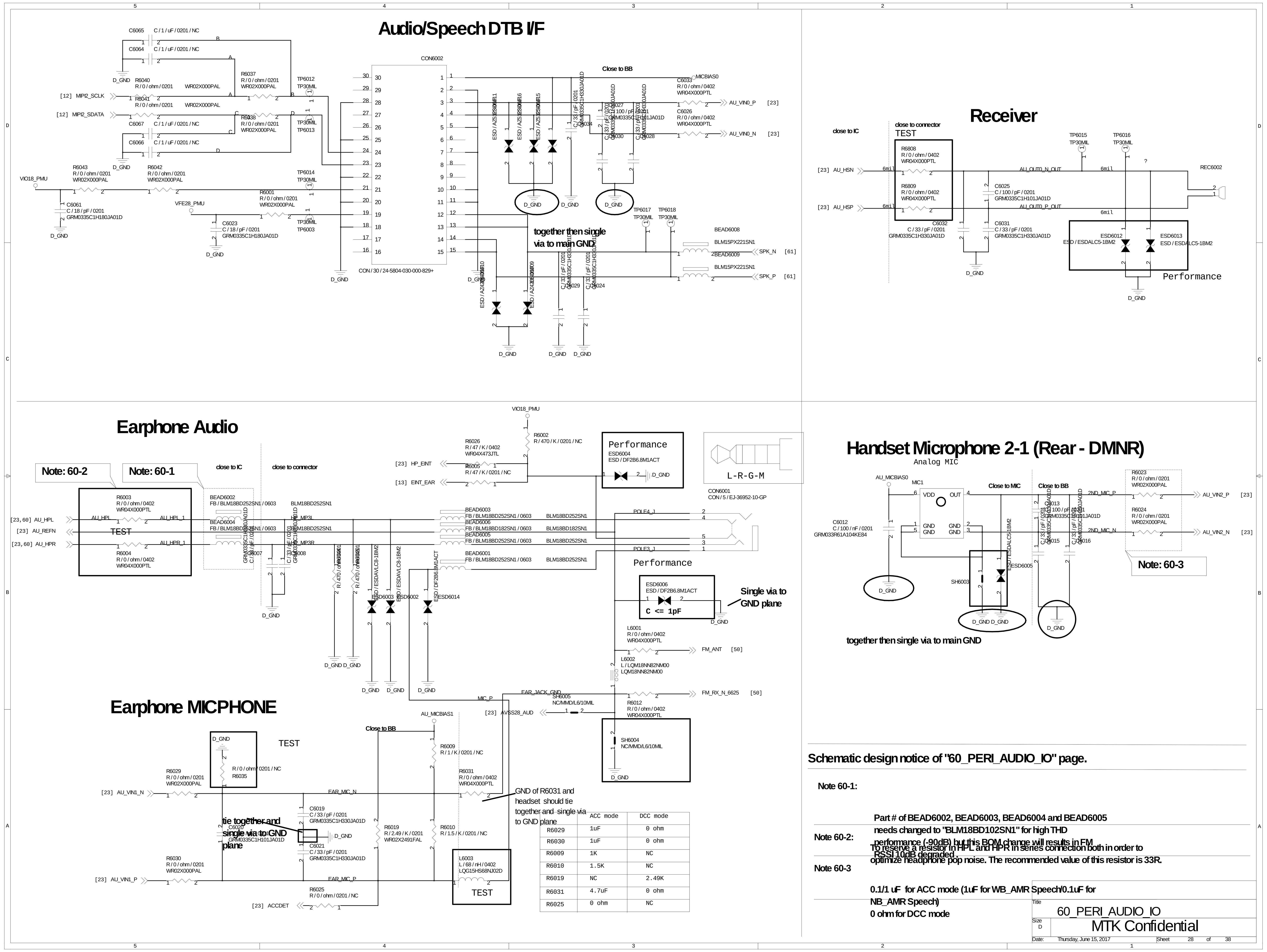


Title: 52_CONNECTIVITY_NFC

Size: D

MTK Confidential

Date: Thursday, June 15, 2017 Sheet 27 of 38



	ACC mode	DCC mode
R6029	1uF	0 ohm
R6030	1uF	0 ohm
R6009	1K	NC
R6010	1.5K	NC
R6019	NC	2.49K
R6031	4.7uF	0 ohm
R6025	0 ohm	NC

Schematic design notice of "60_PERI_AUDIO_IO" page.

Note 60-1:

Part # of BEAD6002, BEAD6003, BEAD6004 and BEAD6005 needs changed to "BLM18BD102SN1" for high THD performance (-90dB) but this BOM change will results in FM RSSI 10dB degraded .

Note 60-2:

To reserve a resistor in HPL and HPR in series connection both in order to optimize headphone pop noise. The recommended value of this resistor is 33R.

Note 60-3

0.1/1 uF for ACC mode (1uF for WB_AMR Speech/0.1uF for NB_AMR Speech)
0 ohm for DCC mode

Title: 60_PERI_AUDIO_IO
Size: D
MTK Confidential
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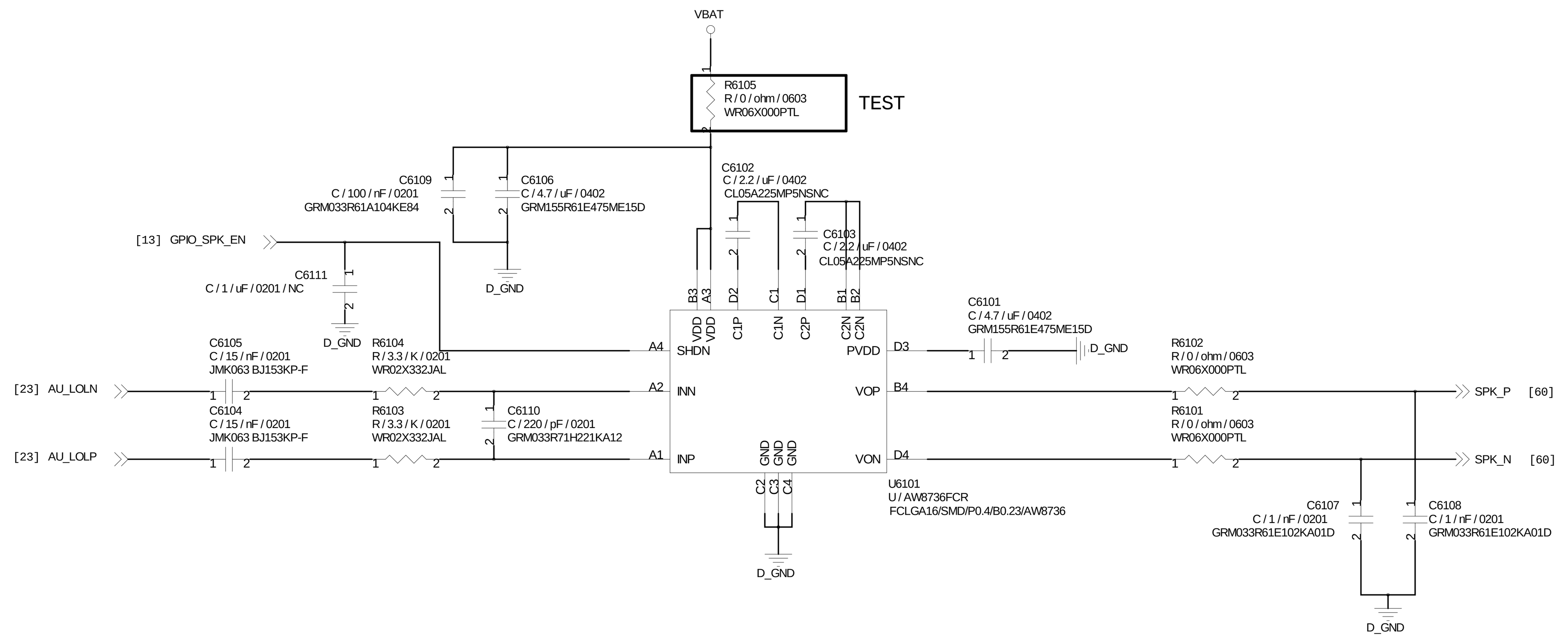
Speaker Amplifier



Title	61_PERI_SPEAKER_AMP
Size D	MTK Confidential
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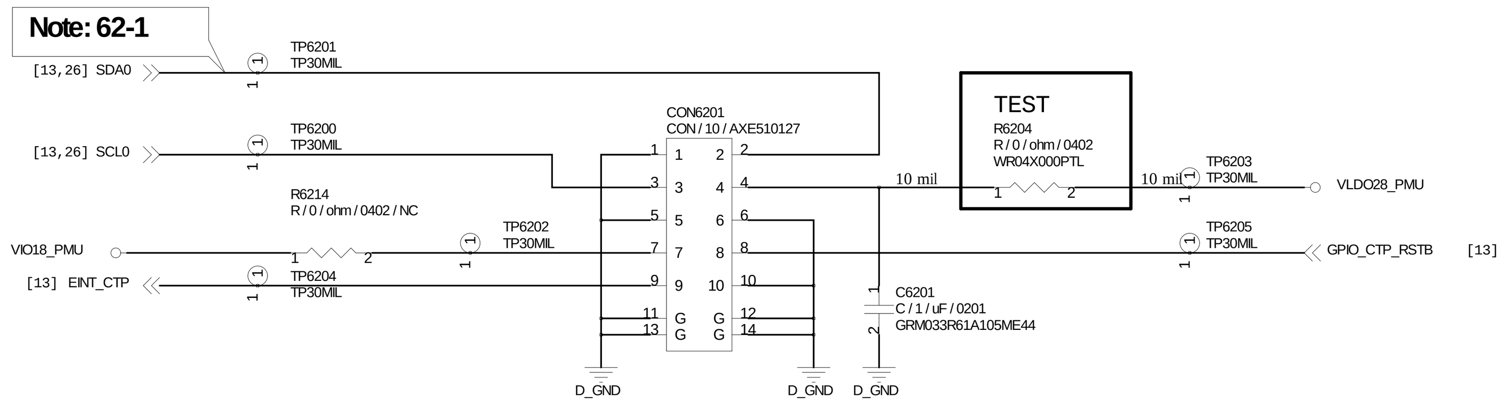
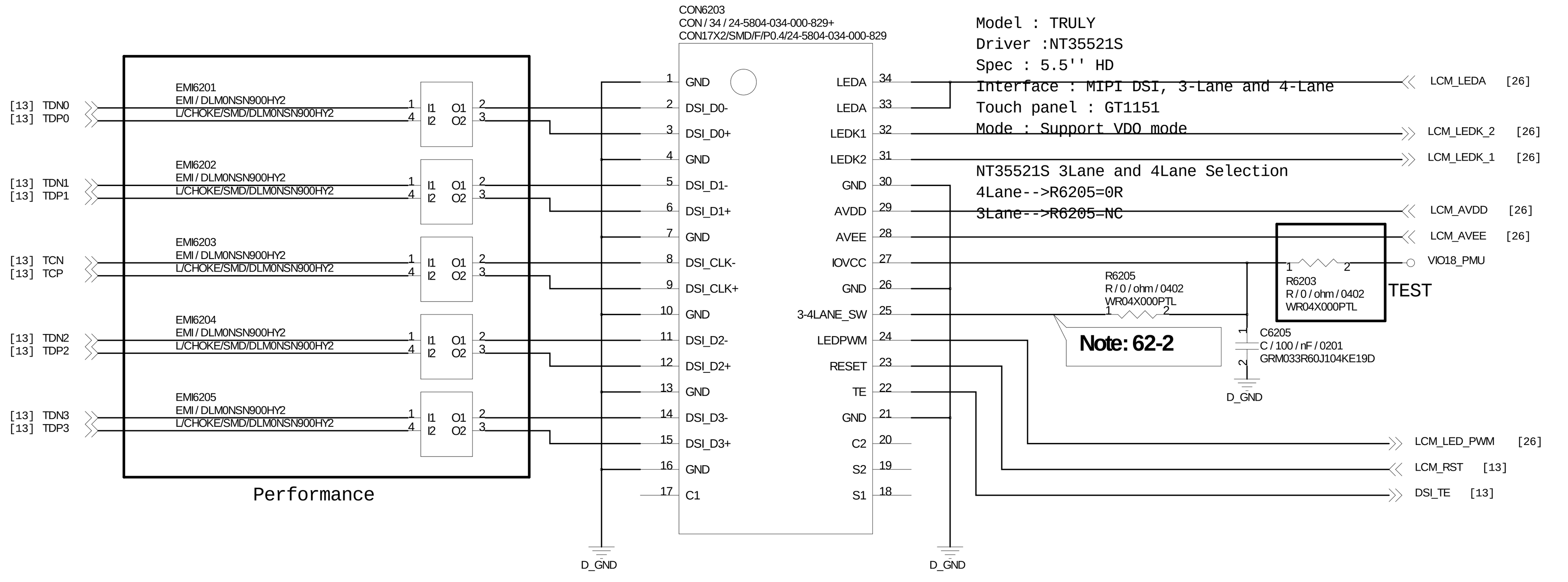
CTP



Main LCM



Schematic design notice of "62_PERI_LCD_CTP" page.

Note 62-1:

COF GT1151 I2C address: 0X5D (Write:0xBA, Read:0xBB)
Or 0X14 (Write:0x28, Read:0x29)

Note 62-2:

NT35520 3Lane and 4Lane Selection
4Lane-->R6205=0R
3Lane-->R6205=NC

Title	62_PERI_LCD_CTP
Size D	MTK Confidential
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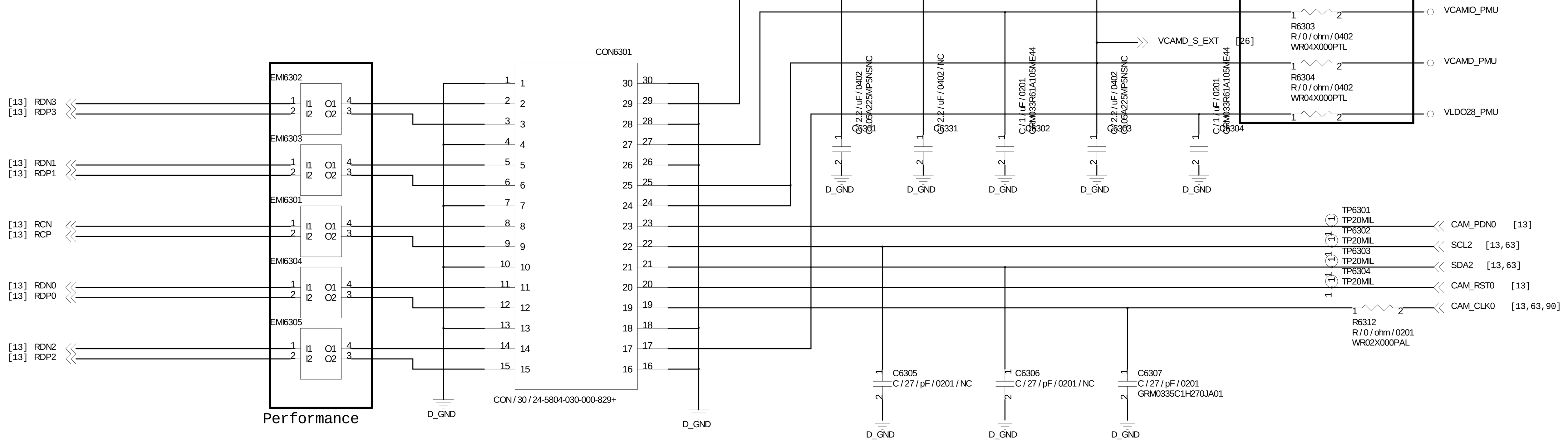
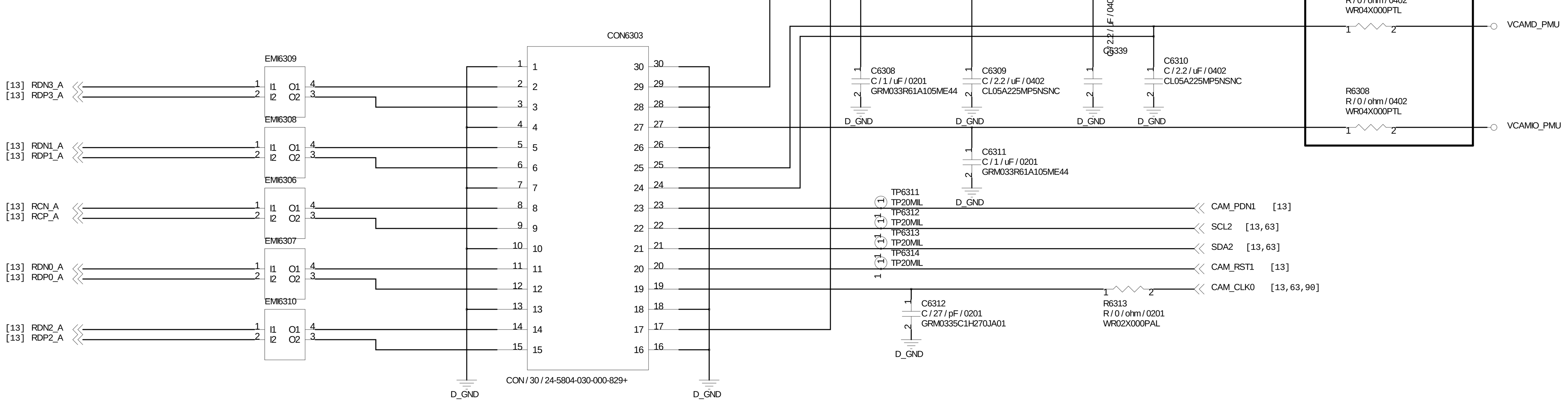
Rear Camera - 13M

Rear camera (IMX338) I2C address: 0X1A (Write:0x34, Read:0x35)
AF driver (BU64297GWZ-TR) I2C address: 0X0C (Write:0x18, Read:0x19)
EEPROM I2C address: 0X50 (Write:0xA0, Read:0xA1)



Front Camera - 8M

Front camera (OV8858) I2C address: 0X10 (Write:0x20, Read:0x21)
AF driver (BU64245GWZ) I2C address: 0X0C (Write:0x18, Read:0x19)
EEPROM I2C address: 0X54 (Write:0xA8, Read:0xA9)



Schematic design notice of "63_PERI_CAMERA_KEYPAD" page.

Note 63-1:

Title	63_PERI_CAMERA
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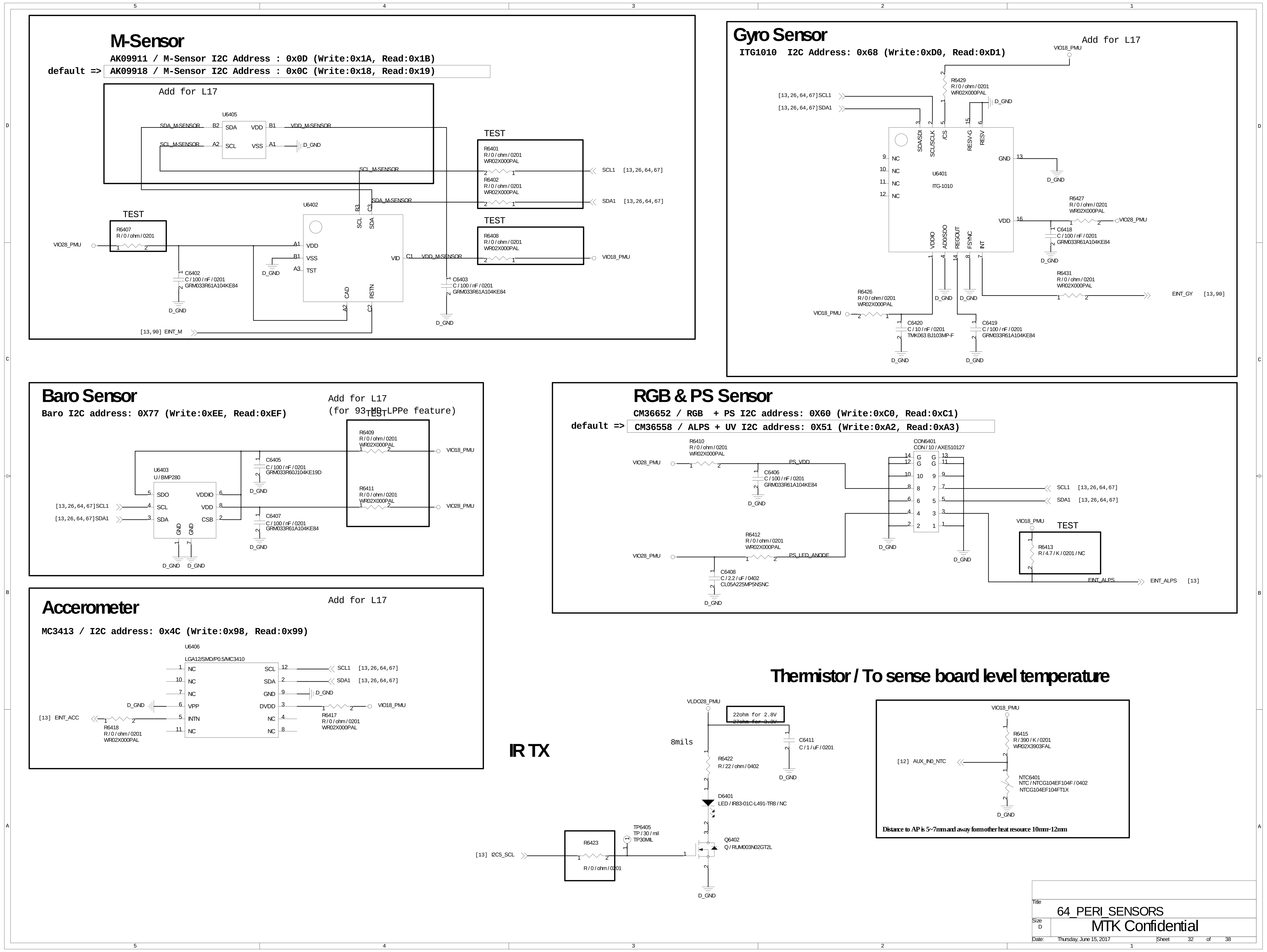
M-Sensor
AK09911 / M-Sensor I2C Address : 0x0D (Write:0x1A, Read:0x1B)
default => AK09918 / M-Sensor I2C Address : 0x0C (Write:0x18, Read:0x19)
Add for L17
U6405
SDA_M-SENSOR
SCL_M-SENSOR
VDD_M-SENSOR
D_GND
TEST
R6401
R / 0 / ohm / 0201
WR02X000PAL
SCL1 [13,26,64,67]
R6402
R / 0 / ohm / 0201
WR02X000PAL
SDA1 [13,26,64,67]
R6408
R / 0 / ohm / 0201
WR02X000PAL
VIO18_PMU
R6407
R / 0 / ohm / 0201
VIO28_PMU
U6402
VDD
VSS
TST
SCL
SDA
VID
CAD
RSTN
C6402
C / 100 / nF / 0201
GRM033R61A104KE84
C6403
C / 100 / nF / 0201
GRM033R61A104KE84
[13,90] EINT_M
Gyro Sensor
ITG1010 I2C Address: 0x68 (Write:0xD0, Read:0xD1)
Add for L17
VIO18_PMU
R6429
R / 0 / ohm / 0201
WR02X000PAL
[13,26,64,67]SCL1
[13,26,64,67]SDA1
U6401
ITG-1010
SDA/SDI
SCL/SCLK
/CS
RESV-G
RESV
NC
GND
VDD
VDDIO
AD0/SDO
REGOUT
FSYNC
INT
R6427
R / 0 / ohm / 0201
WR02X000PAL
VIO28_PMU
C6418
C / 100 / nF / 0201
GRM033R61A104KE84
R6431
R / 0 / ohm / 0201
WR02X000PAL
EINT_GY [13,90]
R6426
R / 0 / ohm / 0201
WR02X000PAL
VIO18_PMU
C6420
C / 10 / nF / 0201
TMK063 BJ103MP-F
C6419
C / 10 / nF / 0201
GRM033R61A104KE84
Baro Sensor
Baro I2C address: 0X77 (Write:0xEE, Read:0xEF)
Add for L17
(for 93-MD-LPPe feature)
TEST
R6409
R / 0 / ohm / 0201
WR02X000PAL
VIO18_PMU
R6411
R / 0 / ohm / 0201
WR02X000PAL
VIO28_PMU
C6405
C / 100 / nF / 0201
GRM033R60J104KE19D
U6403
U / BMP280
SDO
SCL
SDA
VDDIO
VDD
CSB
GND
[13,26,64,67]SCL1
[13,26,64,67]SDA1
C6407
C / 100 / nF / 0201
GRM033R61A104KE84
D_GND
RGB & PS Sensor
CM36652 / RGB + PS I2C address: 0X60 (Write:0xC0, Read:0xC1)
default => CM36558 / ALPS + UV I2C address: 0X51 (Write:0xA2, Read:0xA3)
R6410
R / 0 / ohm / 0201
WR02X000PAL
VIO28_PMU
PS_VDD
C6406
C / 100 / nF / 0201
GRM033R61A104KE84
CON6401
CON / 10 / AXE510127
SCL1 [13,26,64,67]
SDA1 [13,26,64,67]
R6412
R / 0 / ohm / 0201
WR02X000PAL
PS_LED_ANODE
C6408
C / 2.2 / uF / 0402
CL05A225MP5NSNC
VIO18_PMU
TEST
R6413
R / 4.7 / K / 0201 / NC
EINT_ALPS
EINT_ALPS [13]
Accerometer
Add for L17
MC3413 / I2C address: 0x4C (Write:0x98, Read:0x99)
U6406
LGA12/SMD/P0.5/MC3410
NC
VPP
INTN
SCL
SDA
GND
DVDD
SCL1 [13,26,64,67]
SDA1 [13,26,64,67]
D_GND
[13] EINT_ACC
R6418
R / 0 / ohm / 0201
WR02X000PAL
R6417
R / 0 / ohm / 0201
WR02X000PAL
VIO18_PMU
Thermistor / To sense board level temperature
IR TX
VLDO28_PMU
22ohm for 2.8V
C6411
C / 1 / uF / 0201
8mils
R6422
R / 22 / ohm / 0402
D6401
LED / IR83-01C-L491-TR8 / NC
TP6405
TP / 30 / mil
TP30MIL
Q6402
Q / RUM003N02GT2L
[13] I2C5_SCL
R6423
R / 0 / ohm / 0201
VIO18_PMU
R6415
R / 390 / K / 0201
WR02X3903FAL
[12] AUX_IN0_NTC
NTC6401
NTC / NTCG104EF104F / 0402
NTCG104EF104FT1X
Distance to AP is 5~7mm and away form other heat resource 10mm~12mm
Title
64_PERI_SENSORS
Size
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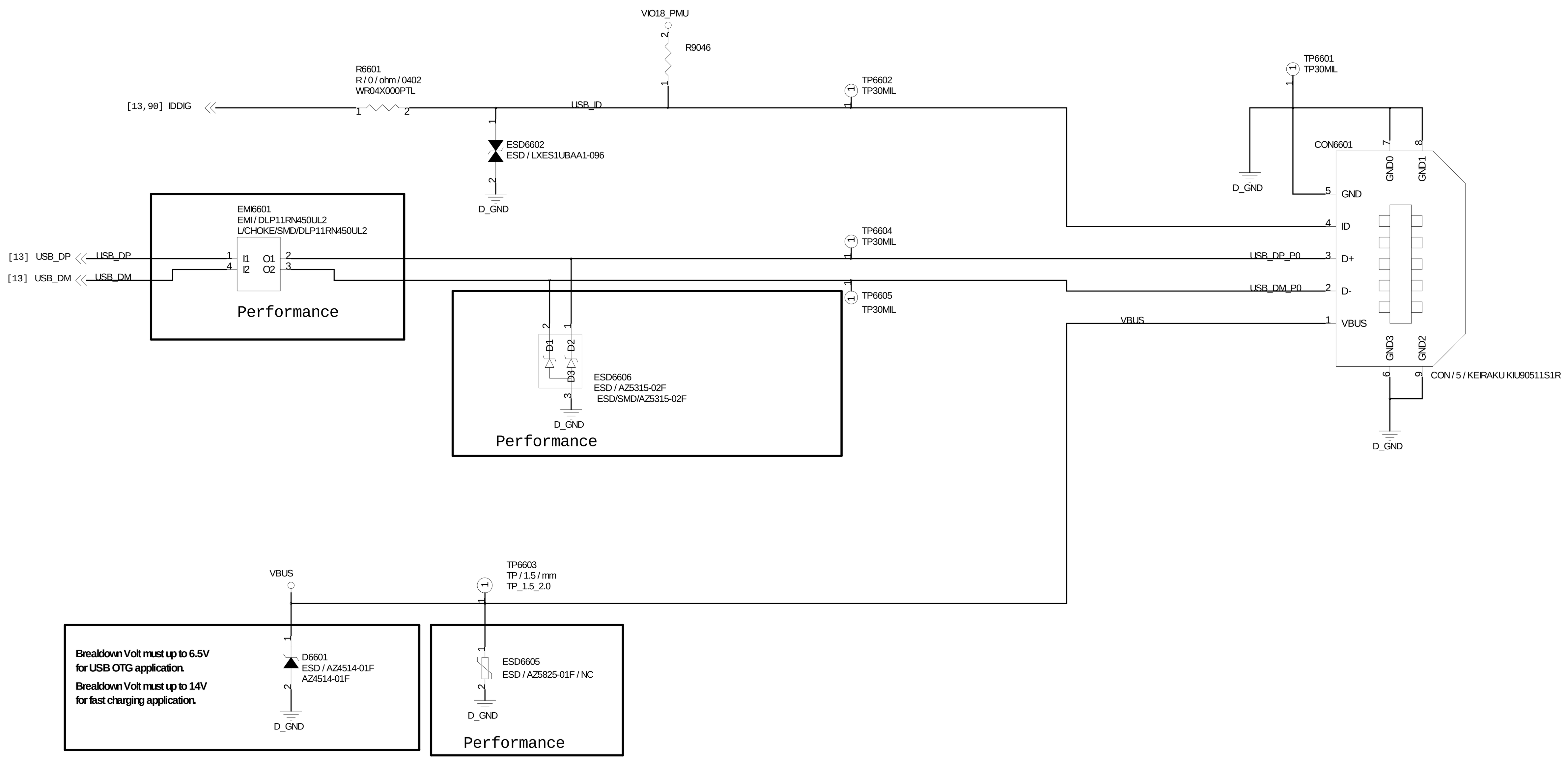

Title	66_PERI_USB_MHL
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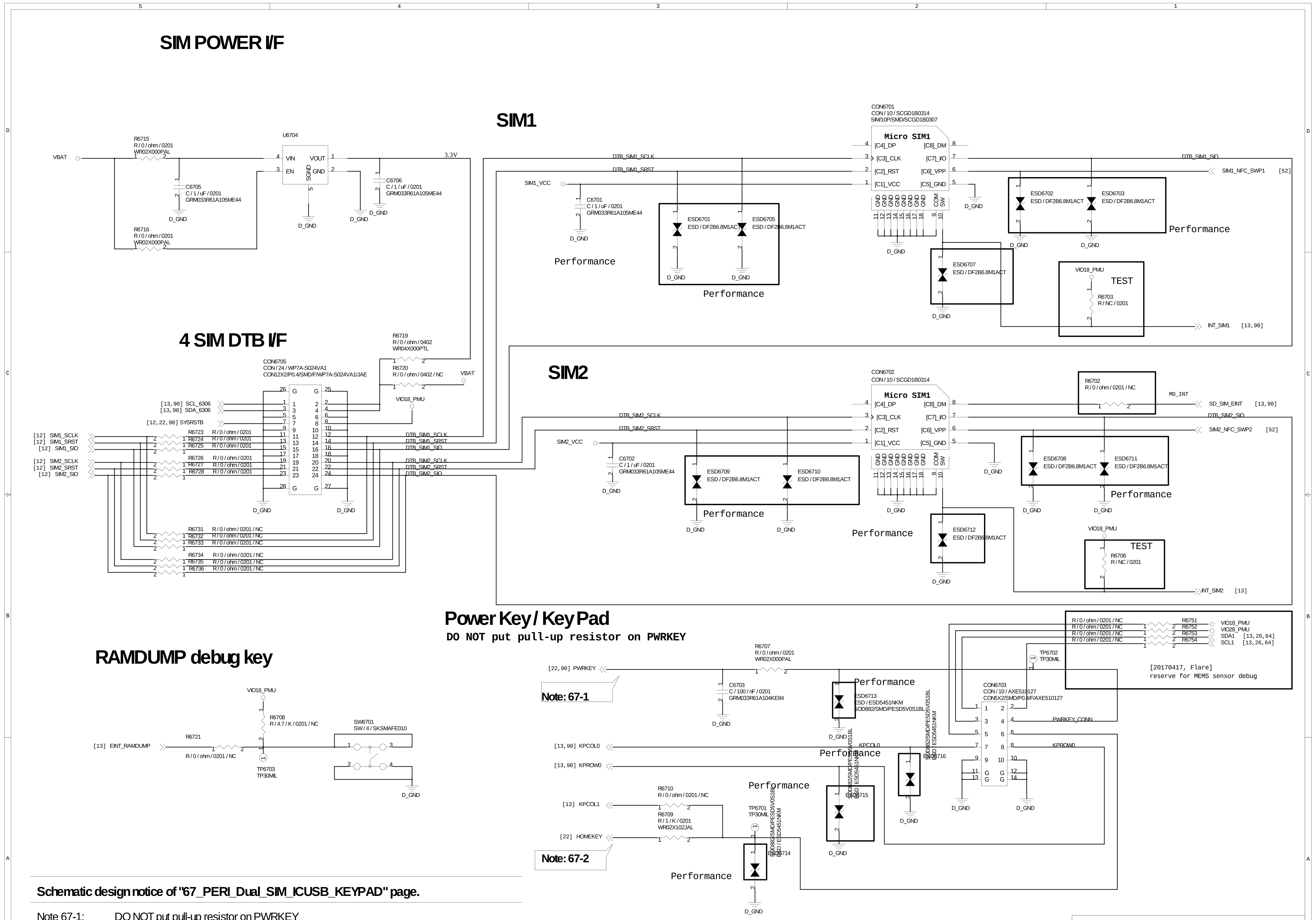

Schematic design notice of "67_PERI_Dual_SIM_ICUSB_KEYPAD" page.

Note 67-1: DO NOT put pull-up resistor on PWRKEY

Note 67-2:
Volume Up : HOME Key / GND
Volume Down : KPROW0/KPCOL0

Title	67_PERI_Dual_SIM_KEYPAD
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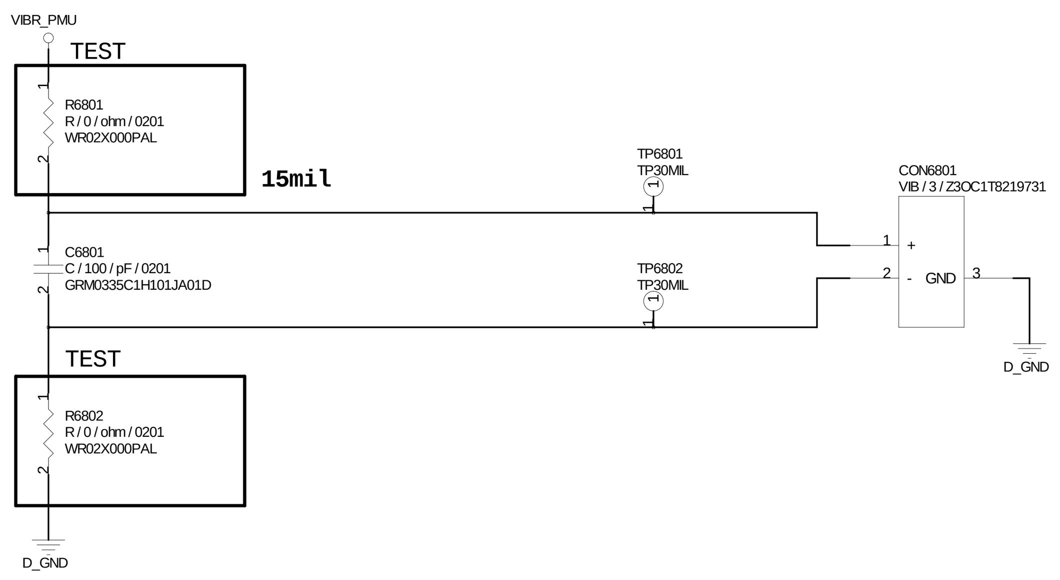
VIBRATOR



Title	68_PERI_VIBRATOR
Size D	MTK Confidential
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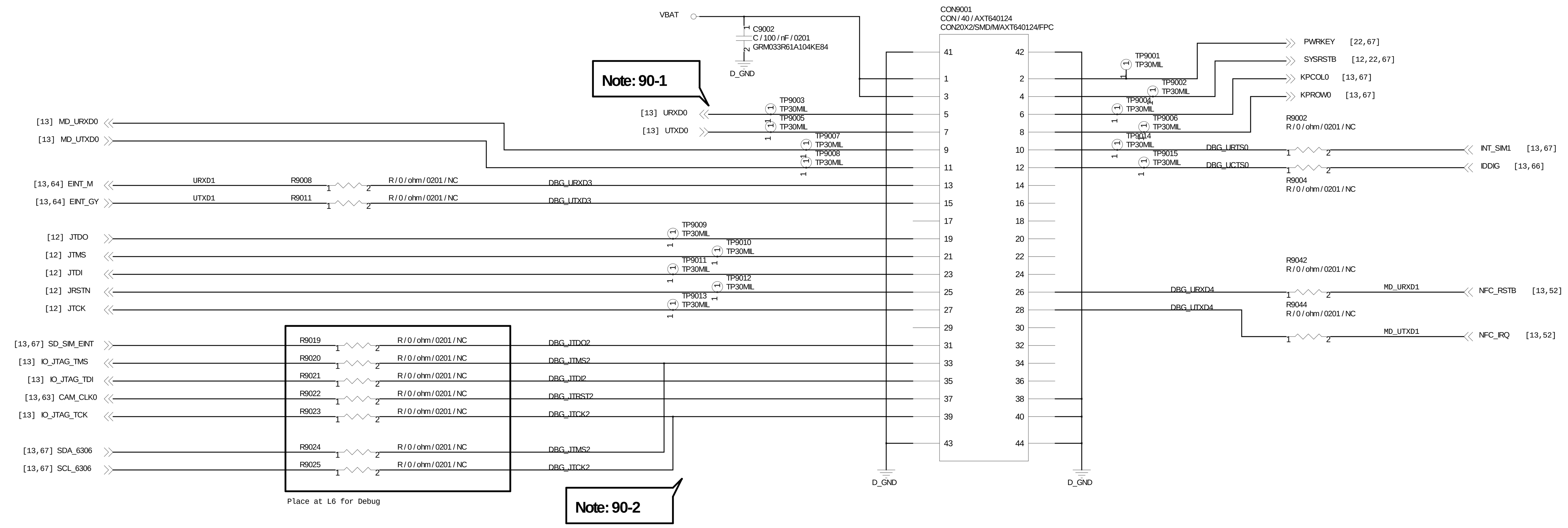

Schematic design notice of "90_DEBUG_IO" page.

Note 90-1:

UART Default support : UART0,

JTAG Default support : AP JTAG

MD_IO_JTAG concurrency with MD_SIB_JTAG

Title	90_DEBUG_IO
Size D	MTK Confidential
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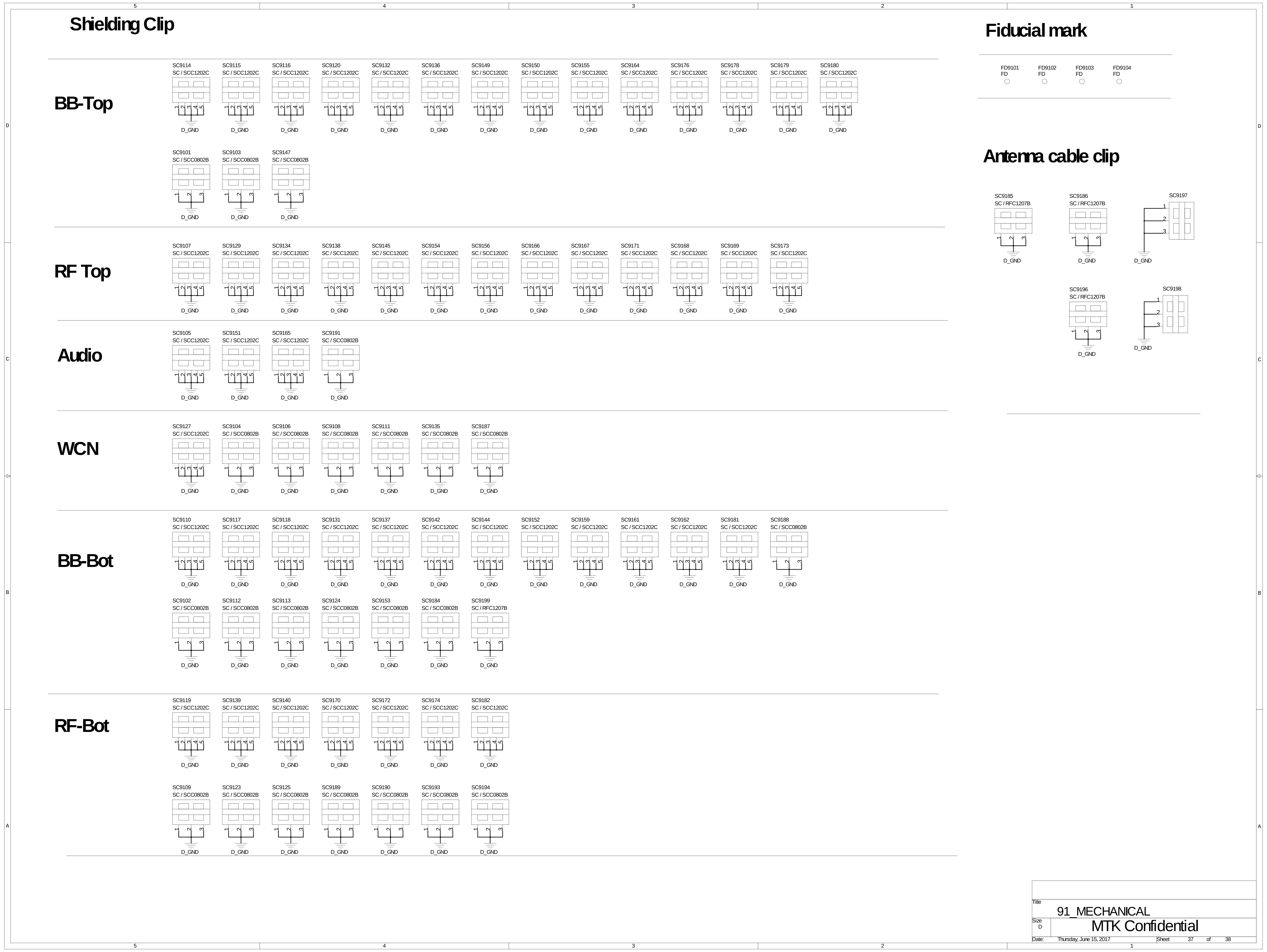

Title: 91_MECHANICAL
Size: D
MTK Confidential
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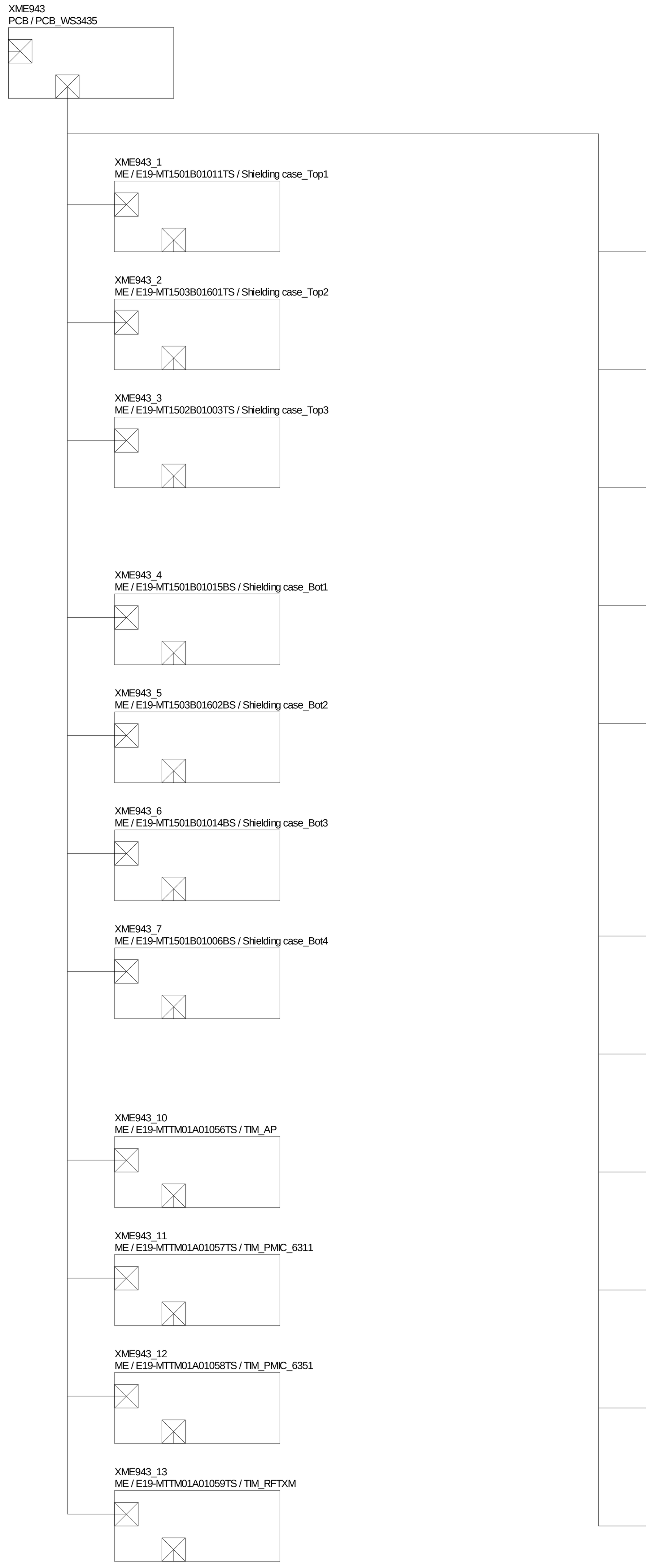
Main PCB_WS3435



Title	**94_ME_PCBA**
Size D	MTK Confidential
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